ORDER NO. SD8012-1811

Service Manual

FM/AM Stereo Receiver

SA-222

[M], [MC]

Areas

* [M] is available in U.S.A.
* [MC] is available in Canada.

TECHNICAL SPECIFICATIONS

Specifications are subject to change without notice for further improvement.

(IHF '78)

■ AMPLIFIER SECTION

Rated minimum sine wave RMS power output
20 Hz~20 kHz both channels driven
0.04% total harmonic distortion
30W per channel (8 ohms)

1 kHz continuous power output	
both channels driven	
0.04% total harmonic distortion	
	33W per channel (8 ohms)
	35W per channel (4 ohms)
Dynamic headroom	0.7 dB (8 ohms)
Total harmonic distortion	
rated power at 20 Hz~20 kHz	0.04% (8 ohms)
half power at 20 Hz~20 kHz	0.025% (8 ohms)
half power at 1 kHz	0.009% (8 ohms)
SMPTE intermodulation distortion	0.04% (8 ohms)
PHONO	RIAA standard curve ±0.8 dB
TUNER, AUX, TAPE	5 Hz~70 kHz, −3 dB
	20 Hz~20 kHz, +0.2 dB, −0.2 dB
Input sensitivity	
PHONO	0.5 mV (2.5 mV, IHF '66)
TAPE	30 mV (150 mV, IHF '66)
S/N (IHF, A)	
PHONO	75 dB (80 dB, IHF '66)
TUNER, AUX, TAPE	80 dB (95 dB, IHF '66)
Maximum input voltage	
PHONO	120 mV (130 mV, 1 kHz)
Input impedance	
PHONO	47 kilohms
TAPE	22 kilohms
Tone controls	
BASS	50 Hz, +10 dB~ −10 dB
TREBLE	20 kHz, +10 dB~ −10 dB
Subsonic filter	30 Hz, −6 dB/oct.
Loudness control (volume at −30 dB)	50 Hz, +9 dB
Low frequency damping factor	30 (8 ohms)
	15 (4 ohms)
Load impedance	
MAIN or REMOTE	4~16 ohms
MAIN and REMOTE	8~16 ohms

■ FM TUNER SECTION

Frequency range	87.9~107.9 MHz
Sensitivity	10.8 dBf (1.9 μV, IHF '58)
50 dB quieting sensitivity	
MONO	13.7 dBf (2.7 μV IHF '58)
STEREO	37.2 dBf (39.7 μV IHF '58)
Total harmonic distortion	
100 Hz	0.15% (MONO), 0.2% (STEREO)
1 kHz	0.15% (MONO), 0.2% (STEREO)
6 kHz	0.3% (MONO), 0.3% (STEREO)
S/N	
MONO	75 dB
STEREO	70 dB
Frequency response	20 Hz~15 kHz, +1 dB, −2 dB
Alternate channel selectivity	70 dB
Capture ratio	1.2 dB
Image rejection at 98 MHz	55 dB
IF rejection at 98 MHz	75 dB
Spurious response rejection at 98 MHz	82 dB
AM suppression	55 dB
Stereo separation	
1 kHz	42 dB
10 kHz	32 dB
Carrier leak	
19 kHz	-38 dB
38 kHz	-50 dB
Antenna terminals	300 ohms (balanced)
	75 ohms (unbalanced)

Technics

Panasonic Company
Division of Matsushita Electric
Corporation of America
One Panasonic Way, Secaucus,
New Jersey 07094

Panasonic Hawaii, Inc.
320 Waiakamilo Road, Honolulu,
Hawaii 96817

Panasonic Canada
Division of Matsushita Electric,
of Canada Ltd.
5770 Ambler Drive,
Mississauga, Ontario L4W 2T3

SA-222

■ AM TUNER SECTION

Frequency range	530~1620 kHz
Sensitivity	30 μV, 300 μV/m
Selectivity	55 dB
Image rejection at 1000 kHz	50 dB
IF rejection at 1000 kHz	40 dB

■ GENERAL

Power consumption	185W
Power supply	AC 120V, 60 Hz
Dimensions (W×H×D)	430 × 120 × 300 mm (16-15/16" × 4-23/32" × 11-13/16")
Weight	5.9 kg (13 lb.)

Note:
This unit is equipped with an FM/AM allocation selector on the rear panel. The specifications shown above are correct with this selector set to the "FM 0.2 MHz/AM 10 kHz" position. If it is set to the "FM 0.05 MHz/AM 9 kHz" position, however, the FM frequency range becomes 87.50~108.00 MHz, and the AM frequency becomes 522~1611 kHz.

Weights and dimensions shown are approximate.

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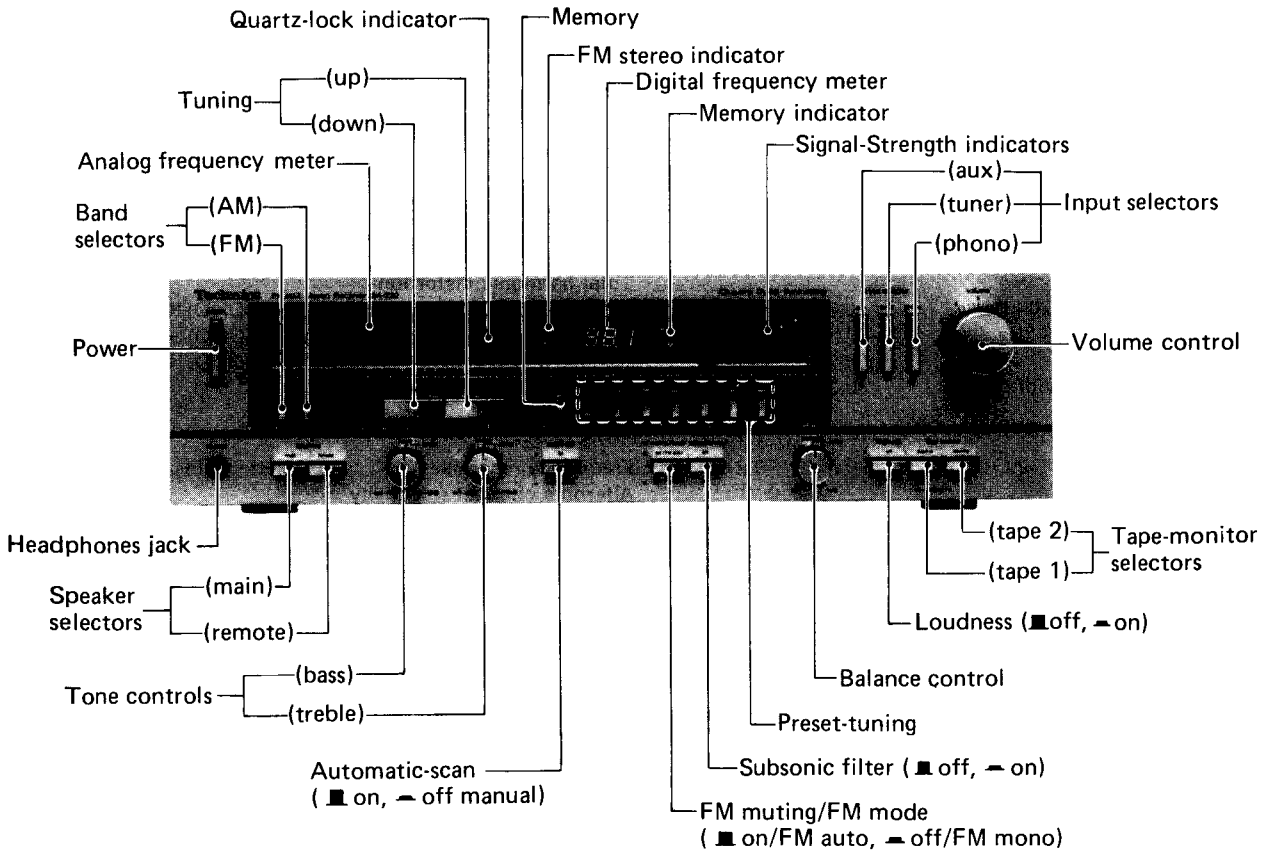
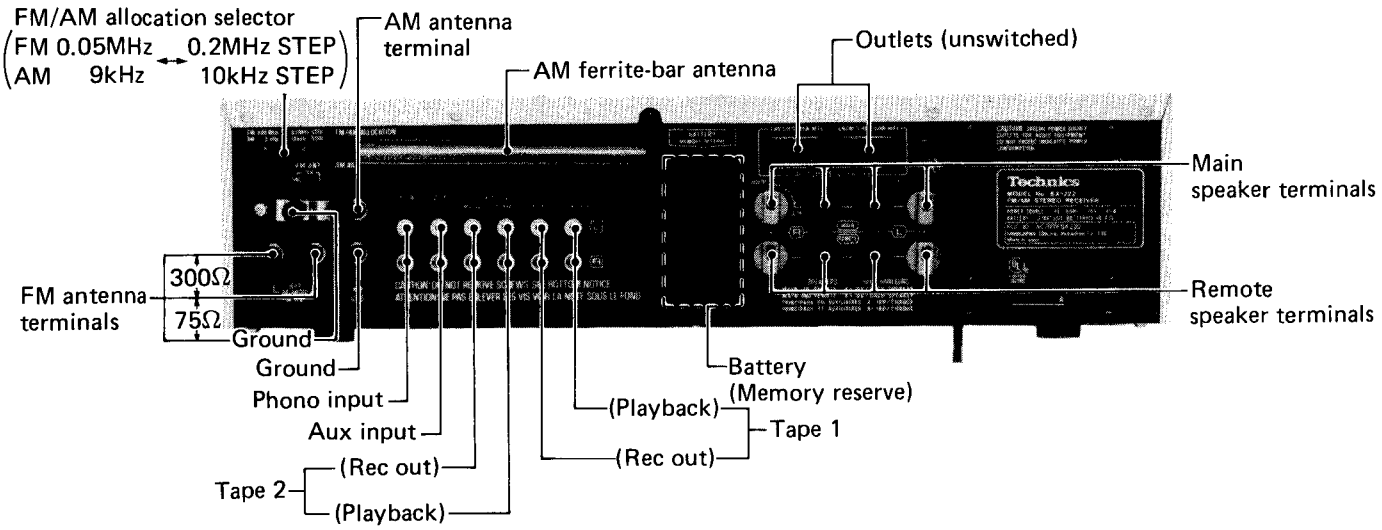
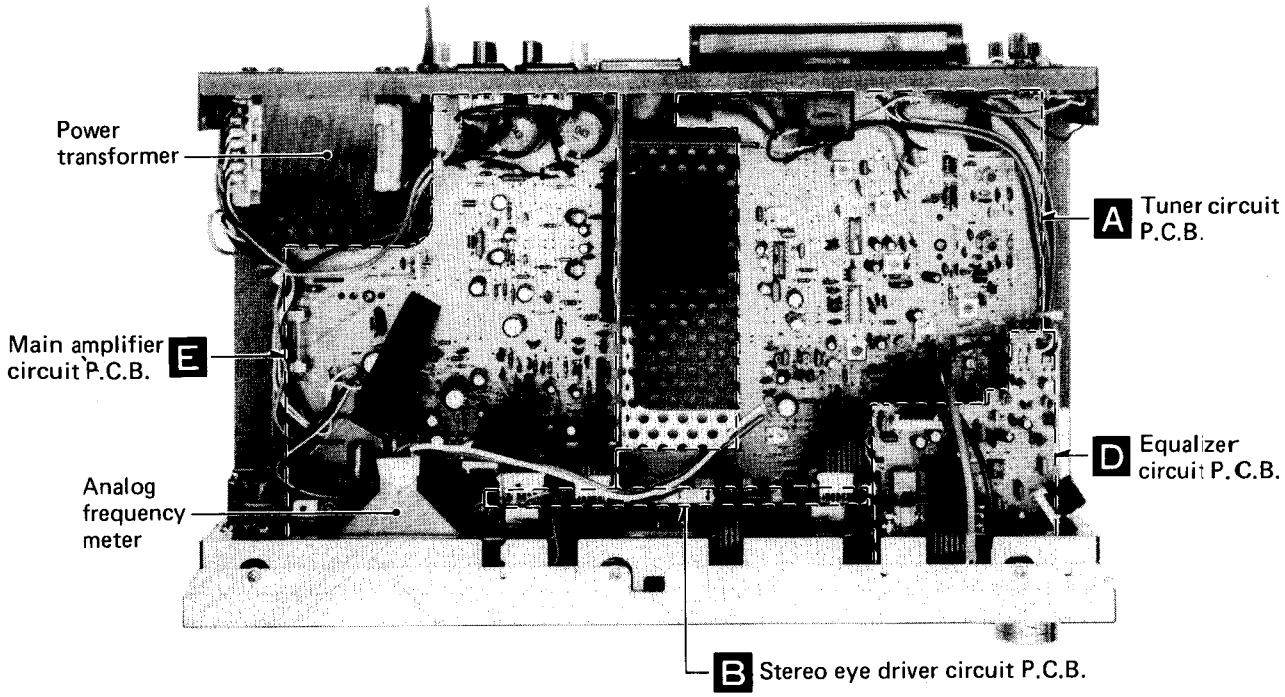
■ LOCATION OF CONTROLS



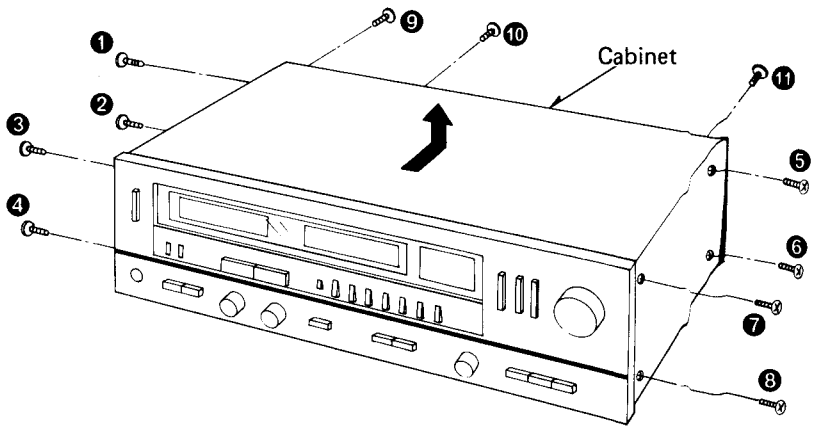



Power transformer
A Tuner circuit P.C.B.
Main amplifier circuit P.C.B. E
D Equalizer circuit P.C.B.
Analog frequency meter
B Stereo eye driver circuit P.C.B.

■ DISASSEMBLY INSTRUCTIONS

• How to remove the cabinet

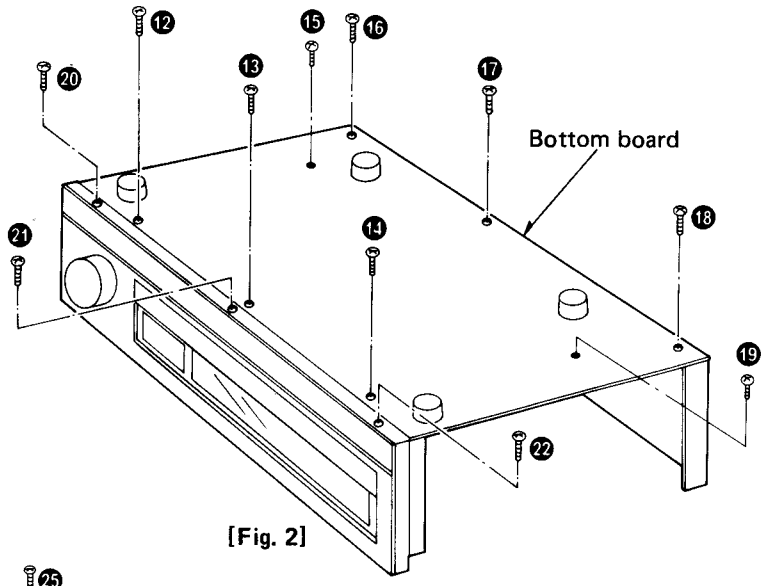
1. Remove the 8 setscrews (Fig. 1 : ❶~❽) on the side and 3 setscrews (Fig. 1 : ❾ ~ ⓫) on the back of the cabinet.
2. Remove the cabinet.



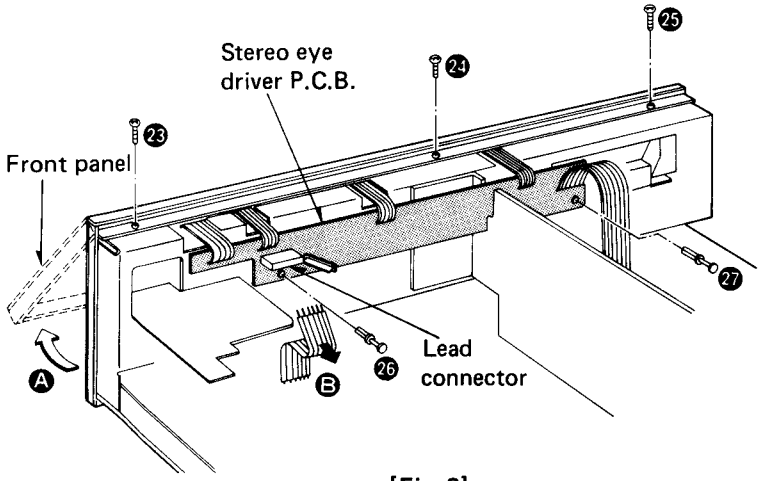
[Fig. 1]

• How to remove the bottom board

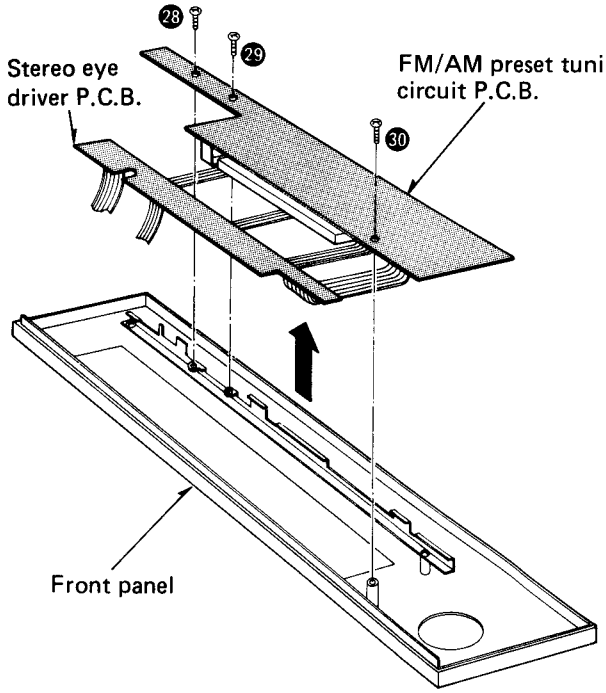
1. Remove the 8 setscrews (Fig. 2 : ⑫ ~ ⑲) of the bottom board.
2. Remove the bottom board.



[Fig. 2]



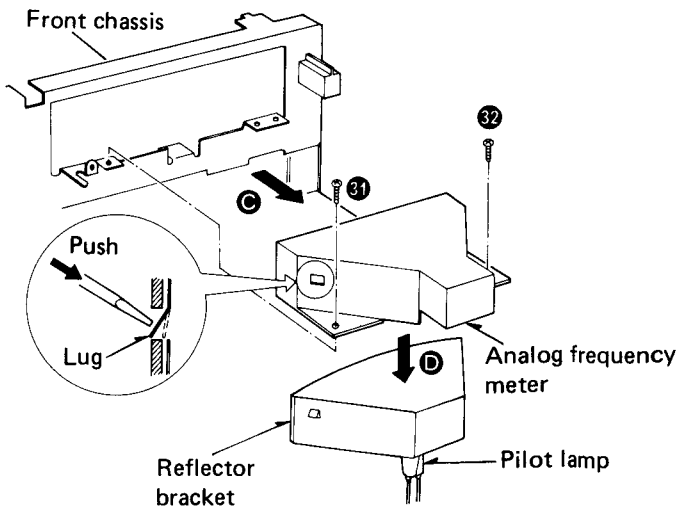
[Fig. 3]



[Fig. 4]

• How to remove the FM/AM preset tuning printed circuit board and the analog frequency meter

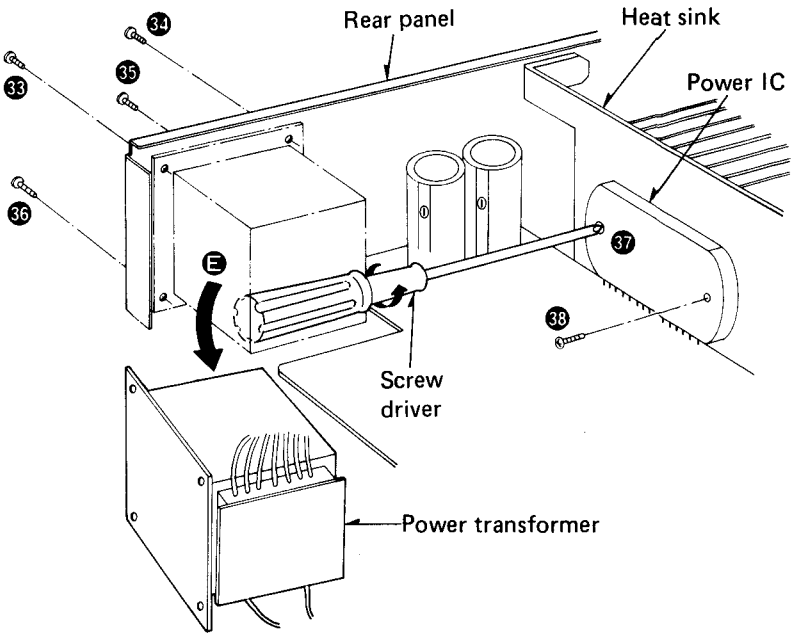
1. Remove the cabinet.
2. Remove the 6 setscrews (Fig. 2 and 3 : ⑳ ~ ㉕) of the front panel.
3. Move the front panel in the direction of the arrow Ⓐ in Fig. 3.
4. Open the "lead holder" of the lead conector and pull out the lead wire of the arrow Ⓑ in Fig. 3.
5. Remove the 2 lock pins (Fig. 3 : ㉖ , ㉗) to detach the stereo eye driver printed circuit board.
6. Remove the 3 setscrews (Fig. 4 : ㉘ ~ ㉚) to detach the FM/AM preset tuning printed circuit board.
7. Remove the 2 setscrews (Fig. 5 : ㉛ , ㉜) to detach the analog frequency meter in direction of the arrow Ⓒ, and 2 lugs (Reflector bracket of left and right side) to detach the reflector bracket from the analog frequency meter in direction of the arrow Ⓓ.



[Fig. 5]

• How to remove the power IC

1. Remove the cabinet and bottom board. (Refer to "How to remove the cabinet," and "How to remove the bottom board.")
2. Remove the 4 setscrews (Fig. 6 : ㉝ ~ ㊱) to detach the power transformer from rear panel in the direction of the arrow Ⓔ.
3. Unsolder of power IC.
4. Remove the 2 setscrews (Fig. 6 : ㊲ , ㊳) used to secure the power IC on the heat sink, and then pull the power IC.
5. When mounting the power IC, apply silicone compound (or equivalent heat diffuser) to the rear side of power IC, and then follow the steps 1 ~ 4 reversely.



[Fig. 6]

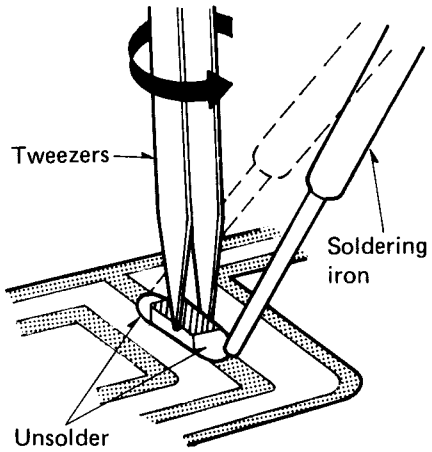
• How to replace chips (resistor, capacitor and jumper)

1. Unsolder from chip by using solder sucker.
2. Remove chip with tweezers by rotating it while removing solder as shown in Fig. 7.
3. Solder circuit board first and then solder chip in the direction of the arrow as shown in Fig. 8.

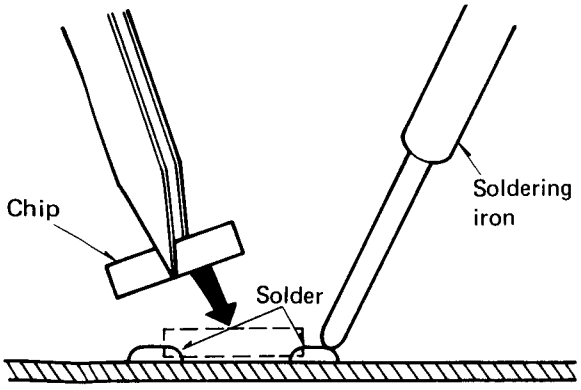
Notes:

1. Do not use chip again which is removed from printed circuit board.
2. Use lead wire with insulator for replacement instead of chip jumper.

Color	Original Parts Name
Black	Chip Resistor and Jumper
Brown, White or Green	Chip Capacitor



[Fig. 7]



[Fig. 8]

• Note for replacing chips

1. Do not heat chips more than three (3) seconds.
2. Be careful not to damage the electrode of chips.
3. Use soldering iron (less than 60W) and tweezers for replacing chips.

• Precautions for repair

When frequency is not indicated, FL (display tube), FL driver, digit circuit, and micro-computer must be checked by oscilloscope.
In this case, take care not to allow short circuit between IC terminals or application of voltage from measuring instrument to IC terminals.

* Since standardized parts are mentioned in the parts list, they are sometimes different in Part No. and Color from the product parts.

Screw No.	Type	Color	Product Part No.	Figure No.
❶ ~ ❽	⊕ 4 x 8 mm, Tapping	Silver	XTB4+8FFN	Fig. 1
❾ ~ ⓫	⊕ 3 x 10 mm, Tapping	Black	XTB3+10BFZ	Fig. 1
⓬ ~ ⓮	⊕ 3 x 12 mm, Tapping (With plain washer)	Red	XTW3+12HFYR	Fig. 2
⓯ ~ ⓳	⊕ 3 x 8 mm, Tapping	Black	XTB3+8BFZ	Fig. 2 and 3
⓴ ~ ㉚	⊕ 3 x 10 mm, Tapping	Gold	XTB3+10B	Fig. 4
㉛ , ㉜	⊕ 3 x 10 mm, Tapping (With plain washer)	Gold	XTW3+10H	Fig. 5
㉝ ~ ㉟	⊕ 4 x 10 mm, (With spring washer & plain washer)	Black	XYA4+FF10FZ	Fig. 6
㊱ , ㊳	⊕ 3 x 16 mm, Tapping (With plain washer)	Gold	XTW3+16H	Fig. 6

■ ADJUSTING INSTRUCTIONS

Note: AM OSC Coil (L202) and AM 2nd IFT (T202) have been already adjusted, and require no adjustment.

AM TUNER ADJUSTMENT

*** Setting and Equipment used**

1. AC and DC electronic voltmeters (VTVM)
2. AM signal generator (AM-SG)
3. Maintain line voltage at 120 volts.
4. Output of signal generator should be no higher than necessary to obtain an output reading.
5. Pull the AM ferrite-bar antenna (L201) outward.
6. Set input selector to "tuner" position.
7. Use a non-metal screwdriver for the adjustment.
8. Set FM·AM muting/mode switch to "on/FM auto" position.
9. Set band selector to "AM" position.
10. Set tape monitor switch to "source" position.
11. Set speaker selector to "main" position.
12. Set automatic-scan switch to "off" position.
13. Set FM/AM allocation selector to "0.2MHz/10kHz" position.

Step No.	AM SIGNAL GENERATOR CONNECTION	AM SIGNAL GENERATOR FREQUENCY	DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	AM-IF ADJUSTMENT					
1	Connect AM-SG to AM antenna terminal through 220pF capacitor. Common to chassis. (Powerful input)	450kHz (30% mod. with 400Hz)	Frequency of non-interference	Connect AC VTVM or scope to "Speaker" terminals of the set.	T201 (1st IFT)	1. Adjust the input frequency and adjustment points so that the output becomes maximum.
	ANALOG FREQUENCY METER ADJUSTMENT * Set band selector to "FM" position.					
2	—	No-Signal	90.1MHz	Connect DC VTVM to TP1 terminal.	L4 (FM OSC Coil)	1. Adjust L4 so that voltage measured by DC voltmeter is 4.49 ± 0.05V.
3	—	No-Signal	106.1MHz	Connect DC VTVM to TP1 terminal.	CT1 (FM OSC Trimmer)	1. Adjust CT1 so that voltage measured by DC voltmeter is 10.71 ± 0.05V.
4	—	No-Signal	100.1MHz	———	VR102 (Frequency meter)	1. Adjust VR102 so that the frequency meter indicates 100.1MHz. (Refer to Fig. 13)
5	—	No-Signal	107.9MHz	———	VR102 (Frequency meter)	1. Adjust VR102 so that the frequency meter indicates 107.9MHz. (Refer to Fig. 12) 2. Repeat steps (4) and (5).
	AM-RF ADJUSTMENT * Set band selector to "AM" position.					
6	—	No-Signal	1100kHz	Connect DC VTVM to TP1 terminal.	CT202 (AM OSC Trimmer)	1. Adjust CT202 so that the frequency meter indicates 1100kHz. (Refer to Fig. 12) 2. If it is not adjustable, set the frequency to 530kHz and adjust L202 (AM OSC Coil) so that the voltage of TP1 is 1.2 ± 0.05V. 3. Next, set the frequency to 1500kHz and make sure that the range is within Ⓐ of Fig. 13. If it is not within the range, perform the adjustments of steps 1 and 3 again.

Step No.	AM SIGNAL GENERATOR CONNECTION	AM SIGNAL GENERATOR FREQUENCY	DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	AM-RF ADJUSTMENT					
7	Connect AM-SG to AM antenna terminal through 200pF capacitor. Common to chassis. (Weak input)	610kHz (30% Mod. with 400Hz)	610kHz	Connect AC VTVM to scope to "Speaker" terminals of the set.	L201 (ANT Coil)	1. Adjust for maximum output. 2. Adjust ferrite core of L201 by screwdriver.
		1500kHz (30% Mod. with 400Hz)	1500kHz	Connect AC VTVM to scope to "Speaker" terminals of the set.	CT201 (ANT Trimmer)	1. Adjust for maximum output. 2. Repeat step (7) until the frequency correctly matches the dial display.

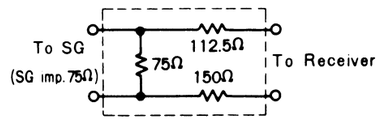
FM TUNER ADJUSTMENT

*** Equipment used**
1. FM signal generator (FM-SG)
2. Stereo modulator
3. Distortion analyser
4. Oscilloscope
5. AC and DC electronic voltmeters (VTVM).
6. Frequency counter (19kHz and 108MHz measurable).
7. FM 300Ω dummy antenna (Fig. 9) .

*** Preparation of FM signal generator (FM-SG)**
1. Connect stereo modulator to FM-SG.
2. Apply SG output to antenna terminal of the set through 300Ω FM dummy antenna.
3. The standard input of the set is 60dB (1mV), 400Hz 100% modulation (Because of using dummy antenna, SG output must be 12dB plus (IHF). That is, when input is 60dB, SG output is to be 72dB.

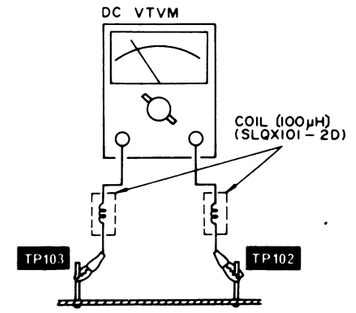
*** Setting**
1. Set band selector to "FM" position.
2. Other setting are the same as in AM tuner adjustment.

Step No.	AM SIGNAL GENERATOR CONNECTION	AM SIGNAL GENERATOR FREQUENCY	DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTMENT	ADJUSTING PROCEDURE
	FM-IF ADJUSTMENT					
8	–	No-Signal	100.1MHz	Connect DC VTVM between TP102 and TP103 through choke coil. (Refer to Fig. 10)	T101 (Discri. IFT)	Adjust T101 core so that voltage measured in signal mode is 0V in 300mV range.
	FM RF ADJUSTMENT					
9	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna.	90.1MHz (100% Mod. with 400Hz) Weak input	90.1MHz	Connect scope to "Speaker" terminals of the set.	L1 (FM ANT Coil) L2 (FM DET Coil) T1 (FM IFT)	1. Check step (2) and if it is deflected readjust of L4. 2. Add weak input so that noise is included in the output wave form. 3. Make the adjustment so that the output wave form is vertically symmetrical. (Refer to Fig. 11) 4. Check step (3) and if it is deflected readjust of CT1.
	FM MUTING LEVEL ADJUSTMENT					
10	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna. (Apply 16dB to antenna terminal)	100.1MHz (100% Mod. with 400Hz)	100.1MHz	Connect AC VTVM or scope to "Speaker" terminals of the set.	VR101(Muting level)	1. Set the FM muting/FM mode switch to "off/mono". 2. With the FM muting/FM mode switch set to "on/auto" adjust VR101 so that the output is given with muting condition released.
	FM MPX PILOT (VCO) ADJUSTMENT					
11	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna.	100.1MHz (Non-modulated)	100.1MHz	Connect frequency counter to TP301 terminal through resistor (100kΩ)	VR301 (VCO)	1. Set the FM muting/FM mode switch to "on/auto". 2. Adjust VR301 to 19kHz ± 30Hz.
	STEREO DISTORTION ADJUSTMENT					
12	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna. (Pilot 10% Mod. stereo signal)	100.1MHz (100% Mod. with 400Hz) (L mode)	100.1MHz	Connect distortion analyser to "Speaker" terminals of the set.	T1 (IFT)	1. Set the FM muting/FM mode switch to "on/auto". 2. Re-adjust the already adjusted T1 within ± 90° from the preset core position so that the distortion of L ch is minimized.

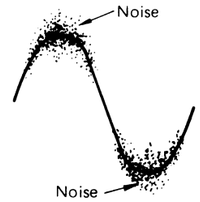


300Ω FM Dummy Antenna

[Fig. 9]

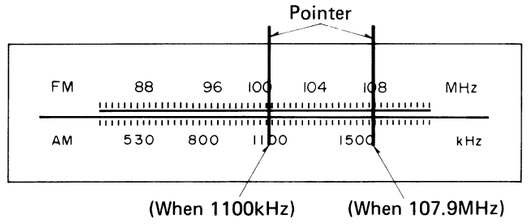


[Fig. 10]

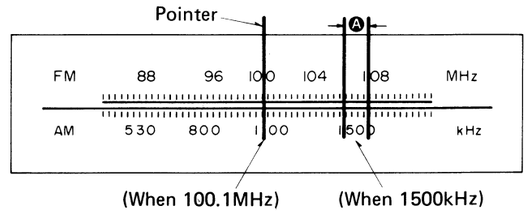


AF output wave form

[Fig. 11]

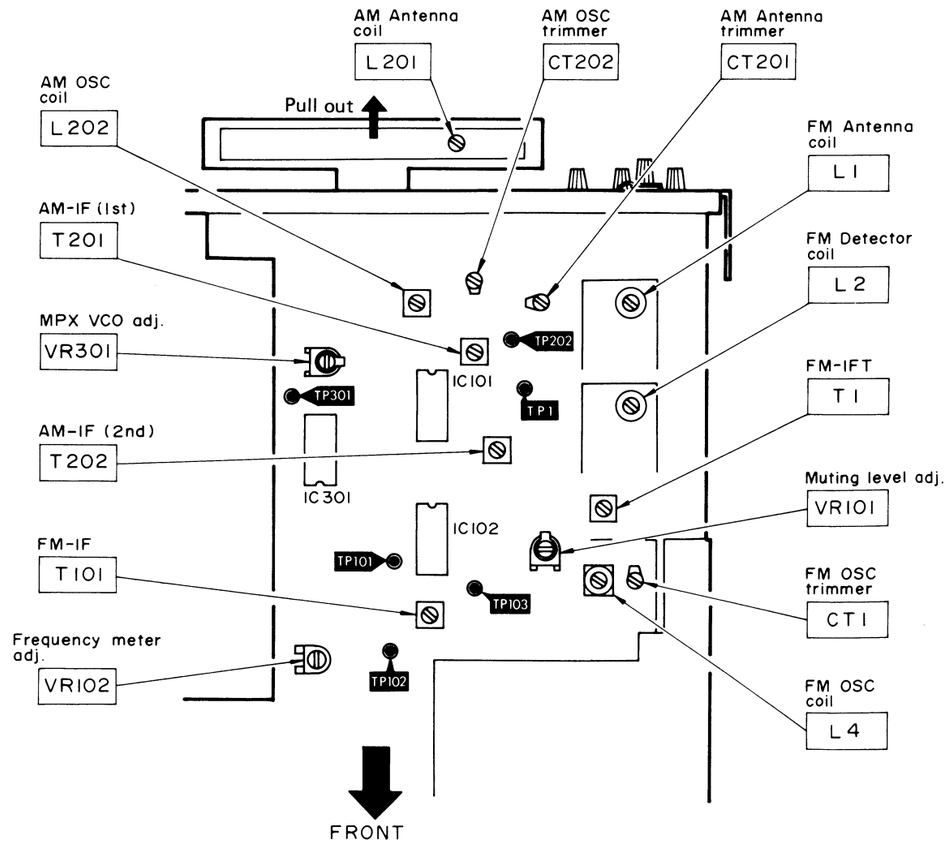


[Fig. 12]

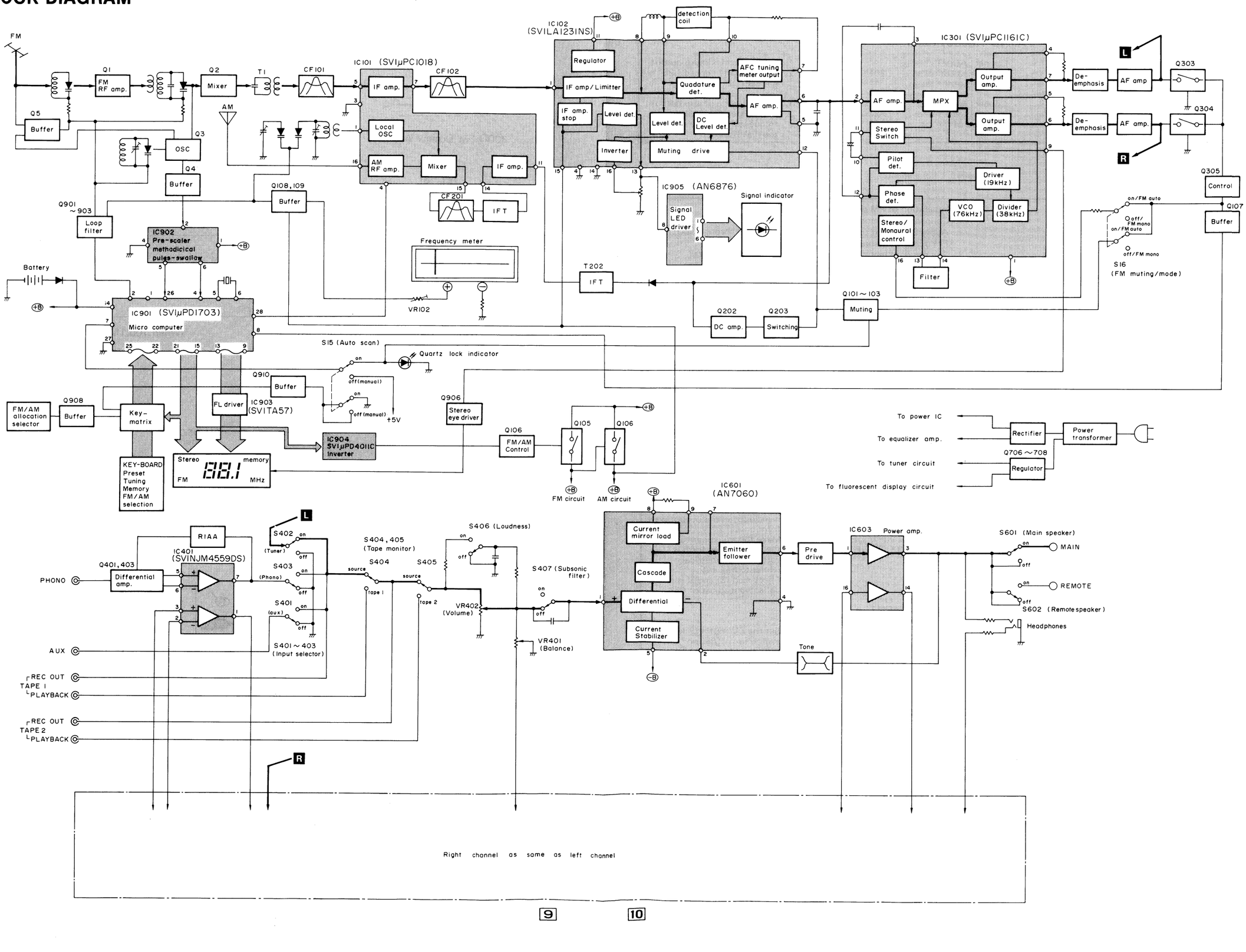


[Fig. 13]

■ ADJUSTING POINTS



■ BLOCK DIAGRAM



■ REPLACEMENT PARTS LIST...Electric Parts

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. ⚠ indicates that only parts specified by the manufacture be used for safety.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

Areas
* [M] is available in U.S.A.
* [MC] is available in Canada.

Ref. No.		Part No.	Part Name & Description
INTEGRATED CIRCUITS			
IC101		RVIUPC1018CF	IC, FM IF Amp. AM RF Amp. and AM Converter
IC102		SVILA1231NS	IC, FM IF Detector
IC301		SVIUPC1161C	IC, FM Multiplex
IC401		SVINJM4559DD	IC, Equalizer Amplifier
IC601, 602		AN7060F	IC, Differential Amplifier
IC603		SVISTK2028	IC, 2 Channel Power Amplifier
IC901		SVID1703CO16	IC, Micro-Computer
IC902		SVIUPB553C–E	IC, Pre-Scaler
IC903		SVITA57	IC, FL Driver
IC904		SVIUPD4011C	IC, Nand Gate
IC905		AN6876	IC, Signal LED Driver
TRANSISTORS			
Q1		2SK195–H1	Transistor, FM RF Amplifier [FET]
Q2		2SC1674–M	Transistor, FM Mixer
Q3, 4		2SC1675–L1	Transistor, FM Oscillator and Buffer (Use in ranks L1 or L2)
Q5, 303, 304		2SC945–P2	Transistor, Muting (Use in ranks P1 or P2)
Q101, 102, 106 107, 108, 109 203, 405, 701 707, 708, 904, 905		2SC1815–Y	Transistor, Switching, regulator (Use in ranks Y or O)
Q103, 104, 105 202, 301, 302 305, 406, 702 703, 704, 906 ~ 910		2SA1015–Y	Transistor, Switching, AF Amplifier & Regulator (Use in ranks Y or O)
Q401 ~ 404		2SC2320L–F	Transistor, Differential Amplifier (Use in ranks F or G)
Q601, 602		2SA992	Transistor, Pre-Driver
Q706		2SD880–Y	Transistor, Regulator (Use in ranks Y or GR)
Q901, 902, 903		2SC1815–G	Transistor, Loop Filter
DIODES			
D1 ~ 3		**MA320G1–N**	Diode, Variable Capacitor (for FM)
D101 ~ 104, 202 204, 205, 709, 710, 901, 902, 904 ~ 917 918, 920, 926		**MA162A**	Diode
D105, 203		**20A90**	Diode, Detector
D201		SVDBB312	Diode, Variable Capacitor (for AM)
D701 ~ 704		SVDS2V20	Rectifier
D705, 706		SVDMZ316B	Diode, 16V Zener
D707, 708, 713, 714, 715		**SVDSR1K2**	Rectifier
D711, 919,		SVDMZ306B	Diode, 6V Zener
D716		SVDMZ333B	Diode, 33V Zener
D717		SVDMZ327B	Diode, 27V Zener
D718		SVDMZ306C1	Diode, 6V Zener
D921, 922, 923		LN213RP	Light Emitting Diode, Red
D924, 925		LN313GP	Light Emitting Diode, Green
D927		LN220RP	Light Emitting Diode, Red
COILS and TRANSFORMERS			
L1		SLA4P55–P	Coil, FM Antenna
L2		SLD4P53–P	Coil, FM Detector
L3		**RLQY15G5**	Coil, Choke
L4		SLO4N21	Coil, FM Local Oscillator
L5		**RLQY25S2**	Coil, Choke
L201		SLF2C33	Coil, AM Ferrite Bar Antenna
L202		SLO2C29–P	Coil, AM Local Oscillator
L601, 602		SLQY15G–30	Coil, Choke
T1		SLI4C109	Transformer, FM IF
T101		SLI4C527–Z	Transformer, FM IF, Discriminator
T201		SLI2C127	Transformer, AM IF
T202		SLI2C413R	Transformer, AM IF
T701	⚠	SLT5M135	Transformer, Power Source

Ref. No.		Part No.	Part Name & Description
CERAMIC FILTERS			
CF101		SVFE107MM–A	Ceramic Filter, FM 10.7MHz, Red
CF102		SVFE107MZ2–A	Ceramic Filter, FM 10.7MHz, Red
CF201		SVFSFP450HT	Ceramic Filter, AM 450kHz
VARIABLE RESISTORS			
VR101		**EVTS3MA00B54**	Muting Level Adjustment, 50kΩ (B)
VR102		**EVNM4AA00B53**	Frequency Meter Adjustment, 5kΩ (B)
VR301		**EVTS3MA00B14**	PLL MPX Adjustment, 10kΩ (B)
VR401		EVHHMA551G25	Balance Control, 200kΩ (G)
VR402		EWJFHA066BF5	Volume Control 250kΩ (B)
VR501		EWJFCY066530	Bass Control, 100kΩ
VR502		EWJFCO066C15	Treble Control 100kΩ (C)
VARIABLE CAPACITORS			
CT1		ECV1ZW06X53N	Trimmer, FM Local Oscillator
CT201, 202		ECV1ZW20X53N	Trimmer, AM Antenna
COMPONENT COMBINATIONS			
Z201		EXAF203Z471C	Component Combination, 0.01μF, (X2), 470Ω
Z301		EXPP182K104C	Component Combination, 0.0018μF, 100kΩ
Z601, 602 [MC] only		ECQJ0517	Component Combination 0.047μF, 10Ω
Z701, 702		RXAF103P22HD	Component Combination 0.01μF (X2)
Z901		EXFP7331MW	Component Combination 330pF (X7)
Z902, 903		EXBP87104K	Component Combination, 100kΩ (X7)
FUSE			
F1	⚠	XBA1F25NU14	Fuse, 2.5A (125V)
CRYSTAL			
X901		SVQ43U452	Crystal, 4.5MHz, Counter Oscillator
LAMP			
PL1		XAMR73S200A	Lamp, Frequency Meter, 6.3V, 0.25A
FLUORESCENT DISPLAY TUBE			
FL		SAD7MT29ZA	Fluorescent Display Tube
SWITCHES			
S1 ~ 12		SSG1	Switch, Memory/Preset/FM-AM/Manual
S14		SSS43	Switch, FM/AM Allocation
S15, 16, 407		SSH399	Switch, Subsonic, FM Muting, Auto Scan
S401 ~ 403		SSH397	Switch, Input Selector
S404 ~ 406		SSH3005	Switch, Tape Monitor & Loudness
S601, 602		SSH2001	Switch, Speakers Selector
S701	⚠	ESB90144T	Switch, Power
RESISTORS			
R1	⚠	**ERD50TJ823**	Carbon, 82kΩ, 1/2W, ± 5%
R2		**RRD18XK472**	Chip, 4.7kΩ, 1/8W, ± 10%
R3		**RRD18XK104**	Chip, 100kΩ, 1/8W, ± 10%
R4		**RRD18XK100**	Chip, 10Ω, 1/8W, ± 10%
R5		**RRD18XK101**	Chip, 100Ω, 1/8W, ± 10%
R6		**RRD18XK472**	Chip, 4.7kΩ, 1/8W, ± 10%

Ref. No.		Part No.	Part Name & Description
R7		**RRD18XK474**	Chip, 470kΩ, 1/8W, ± 10%
R8		**RRD18XK102**	Chip, 1kΩ, 1/8W, ± 10%
R9		**ERD25FJ331**	Carbon, 330Ω, 1/4W, ± 5%
R10		**RRD18XK331**	Chip, 330Ω, 1/8W, ± 10%
R11		**RRD18XK103**	Chip, 10kΩ, 1/8W, ± 10%
R12		**RRD18XK333**	Chip, 33kΩ, 1/8W, ± 10%
R13		**RRD18XK272**	Chip, 2.7kΩ, 1/8W, ± 10%
R14		**RRD18XK104**	Chip, 100kΩ, 1/8W, ± 10%
R15		**ERD25FJ102**	Carbon, 1kΩ, 1/4W, ± 5%
R16		**RRD18XK332**	Chip, 3.3kΩ, 1/8W, ± 10%
R17		**RRD18XK273**	Chip, 27kΩ, 1/8W, ± 10%
R18	⚠	**ERD50FJ472**	Carbon, 4.7kΩ, 1/2W, ± 5%
R101		**RRD18XK102**	Chip, 1kΩ, 1/8W, ± 10%
R102		**RRD18XK391**	Chip, 390Ω, 1/8W, ± 10%
R103		**RRD18XK561**	Chip, 560Ω, 1/8W, ± 10%
R104		**RRD18XK391**	Chip, 390Ω, 1/8W, ± 10%
R105		**ERO25CKF3302**	Metal Film, 33kΩ, 1/4W, ± 1%
R108		**RRD18XK273**	Chip, 27kΩ, 1/8W, ± 10%
R109		**ERD25FJ470**	Carbon, 47Ω, 1/8W, ± 5%
R110		**RRD18XK103**	Chip, 10kΩ, 1/8W, ± 10%
R111		**RRD18XK102**	Chip, 1kΩ, 1/8W, ± 10%
R112		**RRD18XK153**	Chip, 15kΩ, 1/8W, ± 10%
R113		**RRD18XK223**	Chip, 22kΩ, 1/8W, ± 10%
R114		**RRD18XK103**	Chip, 10kΩ, 1/8W, ± 10%
R115		**RRD18XK333**	Chip, 33kΩ, 1/8W, ± 10%
R116		**RRD18XK103**	Chip, 10kΩ, 1/8W, ± 10%
R117		**RRD18XK223**	Chip, 22kΩ, 1/8W, ± 10%
R118		**RRD18XK561**	Chip, 560Ω, 1/8W, ± 10%
R119		**RRD18XK222**	Chip, 2.2kΩ, 1/8W, ± 10%
R120		**RRD18XK561**	Chip, 560Ω, 1/8W, ± 10%
R121		**ERD25TJ473**	Carbon, 47kΩ, 1/4W, ± 5%
R122		**RRD18XK103**	Chip, 10kΩ, 1/8W, ± 10%
R123		**RRD18XK332**	Chip, 3.3kΩ, 1/8W, ± 10%
R124. 125		**RRD18XK333**	Chip, 33kΩ, 1/8W, ± 10%
R126		**ERD25FJ472**	Carbon, 4.7kΩ, 1/4W, ± 5%
R128		**RRD18XK473**	Chip, 47kΩ, 1/8W, ± 10%
R130		**RRD18XK472**	Chip, 4.7kΩ, 1/8W, ± 10%
R133		**RRD18XK102**	Chip, 1kΩ, 1/8W, ± 10%
R134		**RRD18XK153**	Chip, 15kΩ, 1/8W, ± 10%
R135		**RRD18XK823**	Chip, 82kΩ, 1/8W, ± 10%
R136		**RRD18XK393**	Chip, 39kΩ, 1/8W, ± 10%
R137		**RRD18XK104**	Chip, 100kΩ, 1/8W, ± 10%
R138		**RRD18XK683**	Chip, 68kΩ, 1/8W, ± 10%
R139		**RRD18XK272**	Chip, 2.7kΩ, 1/8W, ± 10%
R199		**ERD25TJ224**	Carbon, 220kΩ, 1/4W, ± 5%
R201		**ERD25FJ331**	Carbon, 330Ω, 1/4W, ± 5%
R202		**RRD18XK331**	Chip, 330Ω, 1/8W, ± 10%
R203		**RRD18XK103**	Chip, 10kΩ, 1/8W, ± 10%
R204		**RRD18XK104**	Chip, 100kΩ, 1/8W, ± 10%
R205		**RRD18XK153**	Chip, 15kΩ, 1/8W, ± 10%
R206		**RRD18XK123**	Chip, 12kΩ, 1/8W, ± 10%
R209		**ERD25FJ102**	Carbon, 1kΩ, 1/4W, ± 5%
R210		**RRD18XK101**	Chip 100Ω, 1/8W, ± 10%
R212		**RRD18XK104**	Chip, 100kΩ, 1/8W, ± 10%
R213		**RRD18XK101**	Chip, 100Ω, 1/8W, ± 10%
R214, 215		**RRD18XK103**	Chip, 10kΩ, 1/8W, ± 10%
R216		**RRD18XK562**	Chip, 5.6kΩ, 1/8W, ± 10%
R217		**RRD18XK682**	Chip, 6.8kΩ, 1/8W, ± 10%
R218		**RRD18XK153**	Chip, 15kΩ, 1/8W, ± 10%
R219		**RRD18XK331**	Chip, 330Ω, 1/8W, ± 10%
R220		**RRD18XK183**	Chip, 18kΩ, 1/8W, ± 10%
R221		**RRD18XK122**	Chip, 1.2kΩ, 1/8W, ± 10%
R222		**RRD18XK822**	Chip, 8.2kΩ, 1/8W, ± 10%
R223		**RRD18XK333**	Chip, 33kΩ, 1/8W, ± 10%
R224		**RRD18XK103**	Chip, 10kΩ, 1/8W, ± 10%
R225		**ERO25CKF1003**	Metal Film, 100kΩ, 1/4W, ± 1%
R227		**RRD18XK821**	Chip, 820Ω, 1/8W, ± 10%
R228		**RRD18XK104**	Chip, 100kΩ, 1/8W, ± 10%
R301		**ERD25FJ220**	Carbon, 22Ω, 1/4W, ± 5%
R302		**RRD18XK334**	Chip, 330kΩ, 1/8W, ± 10%
R303		**RRD18XK153**	Chip, 15kΩ, 1/8W, ± 10%
R304		**ERD25TJ153**	Carbon, 15kΩ, 1/4W, ± 5%
R305, 306		**RRD18XK473**	Chip, 47kΩ, 1/8W, ± 10%
R307, 308		**RRD18XK103**	Chip, 10kΩ, 1/8W, ± 10%
R309, 310		**RRD18XK103**	Chip, 10kΩ, 1/8W, ± 10%
R311, 312		**RRD18XK562**	Chip, 5.6kΩ, 1/8W, ± 10%
R313, 314		**RRD18XK472**	Chip, 4.7kΩ, 1/8W, ± 10%
R315, 316		**RRD18XK104**	Chip, 100kΩ, 1/8W, ± 10%
R317		**RRD18XK103**	Chip, 10kΩ, 1/8W, ± 10%
R319		**RRD18XK102**	Chip, 1kΩ, 1/8W, ± 10%
R320		**RRD18XK153**	Chip, 15kΩ, 1/8W, ± 10%

Ref. No.		Part No.	Part Name & Description
R321		**ERD25FJ562**	Carbon, 5.6kΩ, 1/4W, ± 5%
R322		**RRD18XK124**	Chip, 120kΩ, 1/8W, ± 10%
R323		**RRD18XK392**	Chip, 3.9kΩ, 1/8W, ± 10%
R324		**ERD25FJ103**	Carbon, 10kΩ, 1/4W, ± 5%
R325		**RRD18XK473**	Chip, 47kΩ, 1/8W, ± 10%
R327		**ERD25FJ472**	Carbon, 4.7kΩ, 1/4W, ± 5%
R328		**RRD18XK102**	Chip, 1kΩ, 1/8W, ± 10%
R401, 402		**RRD18XK221**	Chip, 220Ω, 1/8W, ± 10%
R403, 404		**ERO25CKF1003**	Metal Film, 100kΩ, 1/4W, ± 1%
R405		**ERO25CKF8202**	Metal Film, 82kΩ, 1/4W, ± 1%
R406		**ERO25CKF8202**	Metal Film, 82kΩ, 1/4W, ± 1%
R407		**RRD18XK271**	Chip, 270Ω, 1/8W, ± 10%
R408		**ERD25FJ271**	Carbon, 270Ω, 1/4W, ± 5%
R409, 410		**RRD18XK680**	Chip, 68Ω, 1/8W, ± 10%
R411, 412		**RRD18KX184**	Chip, 180kΩ, 1/8W, ± 10%
R413, 414		**RRD18XK123**	Chip, 12kΩ, 1/8W, ± 10%
R415, 416		**RRD18XK104**	Chip, 100kΩ, 1/8W, ± 10%
R417, 418		**RRD18XK221**	Chip, 220kΩ, 1/8W, ± 10%
R419, 420		**ERD25TJ124**	Carbon, 120kΩ, 1/4W, ± 5%
R421, 422		**RRD18XK222**	Chip, 2.2kΩ, 1/8W, ± 10%
R423, 424		**ERD25TJ104**	Carbon, 100kΩ, 1/4W, ± 5%
R425, 426		**ERD25TJ393**	Carbon, 39kΩ, 1/4W, ± 5%
R427, 428		**ERD25TJ124**	Carbon, 120kΩ, 1/4W, ± 5%
R429		**ERD25FJ331**	Carbon, 330Ω, 1/4W, ± 5%
R430		**RRD18XK331**	Chip, 330Ω, 1/8W, ± 10%
R433, 434		**RRD18XK822**	Chip, 8.2kΩ, 1/8W, ± 10%
R435, 436		**RRD18XK822**	Chip, 8.2kΩ, 1/8W, ± 10%
R437, 438		**RRD18XK822**	Chip, 8.2kΩ, 1/8W, ± 10%
R439, 440		**RRD18XK391**	Chip, 390Ω, 1/8W, ± 10%
R441, 442		**RRD18XK103**	Chip, 10kΩ, 1/8W, ± 10%
R445, 446		**RRD18XK223**	Chip, 22kΩ, 1/8W, ± 10%
R447, 448		**ERD25FJ331**	Carbon, 330Ω, 1/4W, ± 5%
R501, 502		**ERD25FJ821**	Carbon, 820Ω, 1/4W, ± 5%
R503, 504		**RRD18XK223**	Chip, 22kΩ, 1/8W, ± 10%
R505, 506		**RRD18XK392**	Chip, 3.9kΩ, 1/8W, ± 10%
R507, 508		**ERD25FJ562**	Carbon, 5.6kΩ, 1/4W, ± 5%
R509, 510		**RRD18XK102**	Chip, 1kΩ, 1/8W, ± 10%
R601, 602		**ERD25FJ102**	Carbon, 1kΩ, 1/4W, ± 5%
R603, 604		**ERD25TJ823**	Carbon, 82kΩ, 1/4W, ± 5%
R605, 606		**ERD25TJ393**	Carbon, 39kΩ, 1/4W, ± 5%
R607, 608		**ERD25TJ393**	Carbon, 39kΩ, 1/4W, ± 5%
R611, 612		**ERD25FJ561**	Carbon, 560Ω, 1/4W, ± 5%
R613, 614	⚠	**ERD25FJ470**	Carbon, 47Ω, 1/4W, ± 5%
R615, 616		**ERD25FJ222**	Carbon, 2.2kΩ, 1/4W, ± 5%
R617, 618		**ERD25FJ272**	Carbon, 2.7kΩ, 1/4W, ± 5%
R619, 620	⚠	**ERD50FJ100**	Carbon, 10Ω, 1/2W, ± 5%
R621, 622		**ERG1ANJ331**	Metal Oxide, 330Ω, 1W, ± 5%
R623, 624		**ERD25TJ123**	Carbon, 12kΩ, 1/4W, ± 5%
R625	⚠	**ERD25FJ470**	Carbon, 47Ω, 1/4W, ± 5%
R627, 628[M] only		**ERD50FJ100**	Carbon, 10Ω, 1/2W, ± 5%
R701, 702		**ERG1ANJ122**	Metal Oxide, 1.2kΩ, 1W, ± 5%
R703		**ERG1ANJ152**	Metal Oxide, 1.5kΩ, 1W, ± 5%
R704		**ERD25TJ393**	Carbon, 39kΩ, 1/4W, ± 5%
R705		**ERD25TJ154**	Carbon, 150kΩ, 1/4W, ± 5%
R706		**ERD25FJ562**	Carbon, 5.6kΩ, 1/4W, ± 5%
R707		**ERD25TJ473**	Carbon, 47kΩ, 1/4W, ± 5%
R708		**ERD25TJ274**	Carbon, 270kΩ, 1/4W, ± 5%
R709, 710		**ERD25FJ103**	Carbon, 10kΩ, 1/4W, ± 5%
R711		**ERD25FJ103**	Carbon, 10kΩ, 1/4W, ± 5%
R713	⚠	**ERD50FJ332**	Carbon, 3.3kΩ, 1/2W, ± 5%
R717	⚠	**ERD25FJ152**	Carbon, 1.5kΩ, 1/4W, ± 5%
R718	⚠	**ERD50FJ222**	Carbon, 2.2kΩ, 1/2W, ± 5%
R719		**ERD25FJ561**	Carbon, 560Ω, 1/4W, ± 5%
R720		**ERG3ANJ820**	Metal Oxide, 82Ω, 3W, ± 5%
R721		**ERD25FJ122**	Carbon, 1.2kΩ, 1/4W, ± 5%
R722		**ERD25FJ821**	Carbon, 820Ω, 1/4W, ± 5%
R723		**ERG2ANJ331**	Metal Oxide, 330Ω, 2W, ± 5%
R724		**ERD25FJ222**	Carbon, 2.2kΩ, 1/4W, ± 5%
R725	⚠	**ERD25FJ120**	Carbon, 12Ω, 1/4W, ± 5%
R726		**ERD25FJ272**	Carbon, 2.7kΩ, 1/4W, ± 5%
R727		**ERD25FJ332**	Carbon, 3.3kΩ, 1/4W, ± 5%
R728	⚠	**ERD25FJ101**	Carbon, 100Ω, 1/4W, ± 5%
R729	⚠	**ERD50FJ390**	Carbon, 39Ω, 1/2W, ± 5%
R730		**ERC12ZGK335**	Solid, 3.3MΩ, 1/2W, ± 10%
R731, 732		**ERD25FJ221**	Carbon, 220Ω, 1/4W, ± 5%
R901		**ERD25FJ102**	Carbon, 1kΩ, 1/4W, ± 5%
R902		**RRD18XK821**	Chip, 820Ω, 1/8W, ± 10%
R903		**RRD18XK223**	Chip, 22kΩ, 1/8W, ± 10%
R904		**RRD18XK103**	Chip, 10kΩ, 1/8W, ± 10%
R905		**RRD18XK104**	Chip, 100kΩ, 1/8W, ± 10%
R906, 907		**RRD18XK331**	Chip, 330Ω, 1/8W, ± 10%

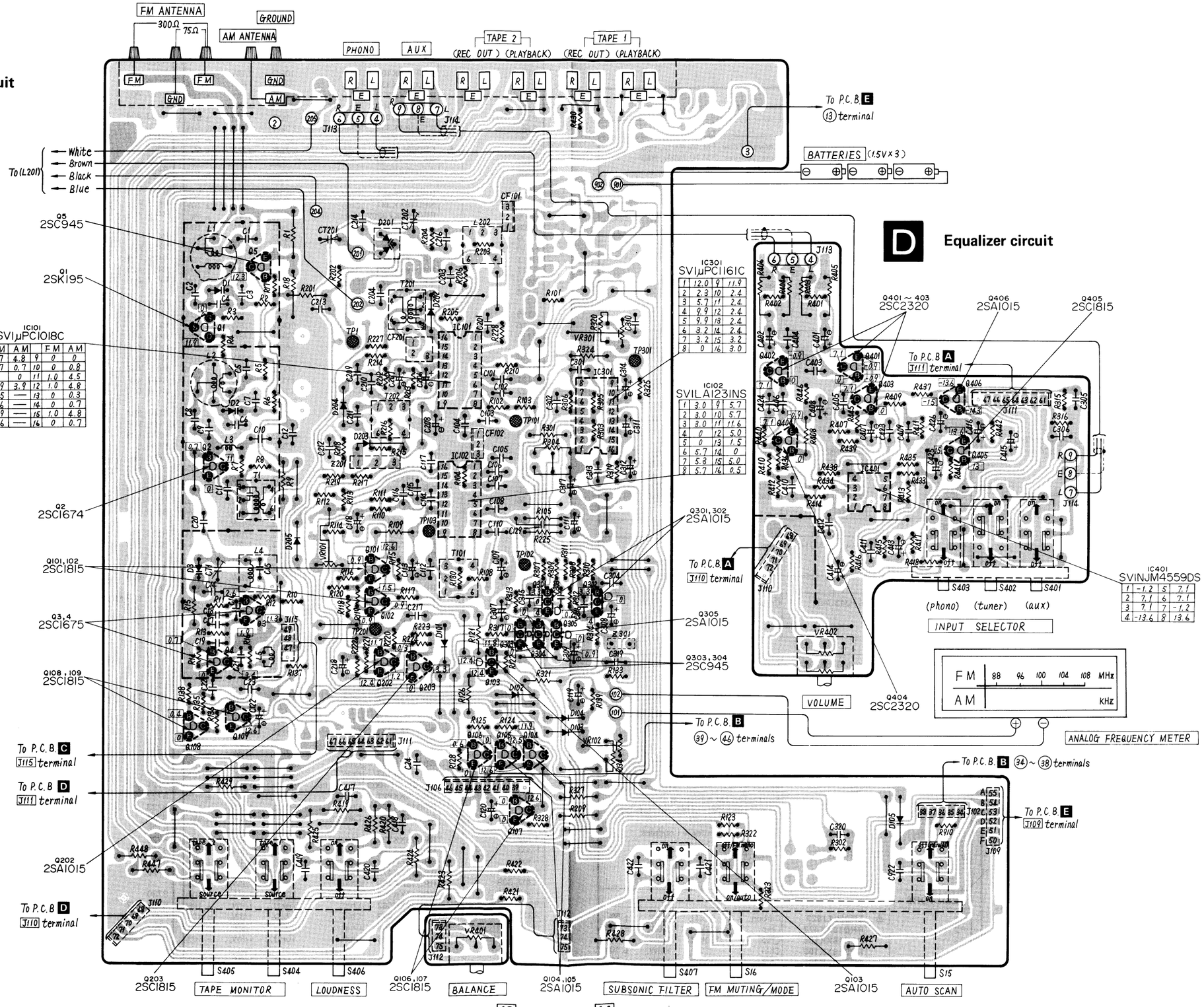
Continued on page 24

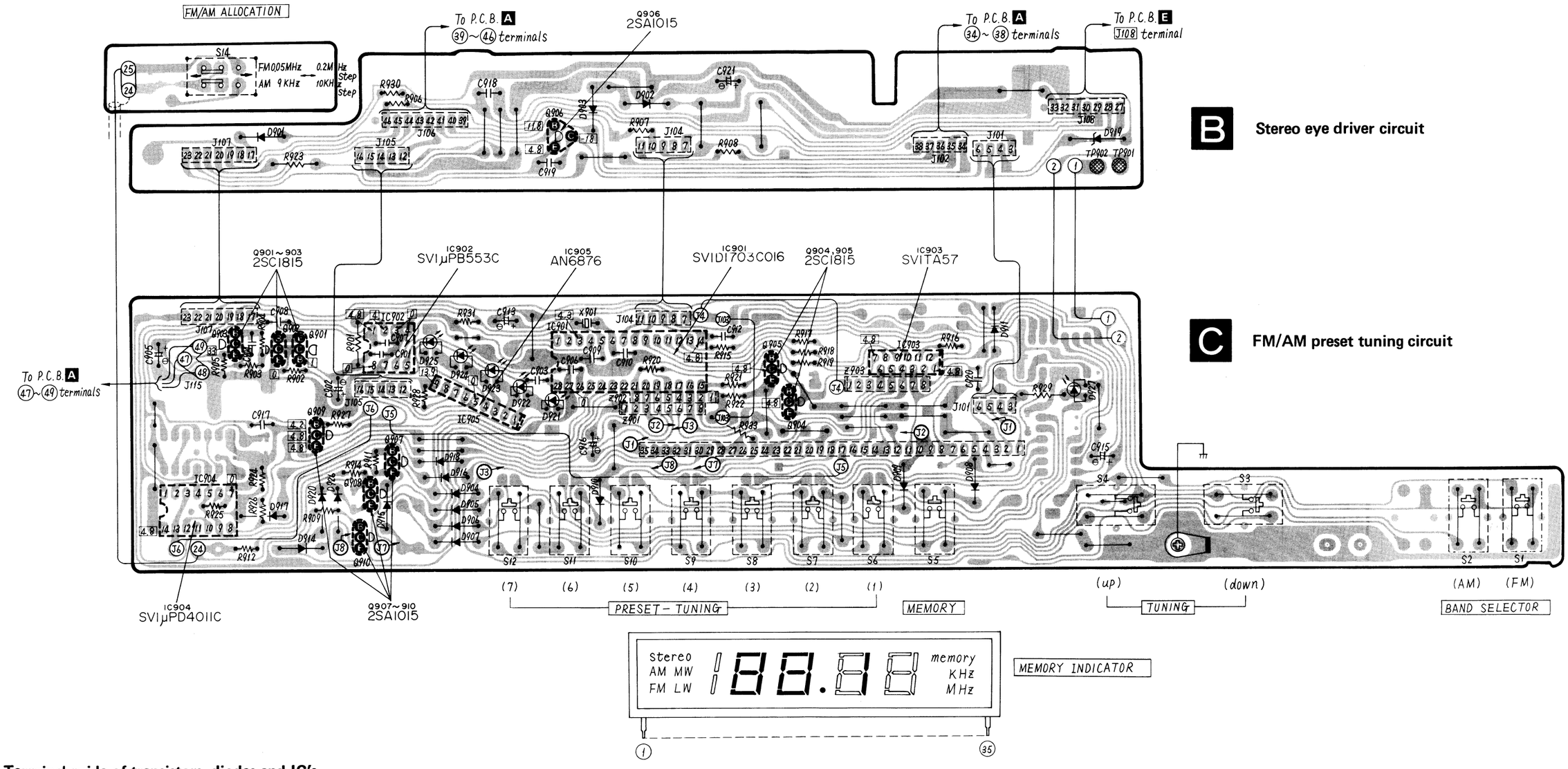
■ PRINTED CIRCUIT BOARD

Ground (Earth) lines

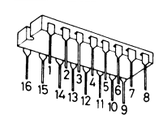
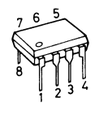
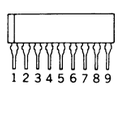
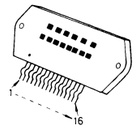
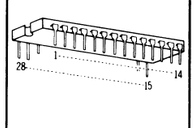
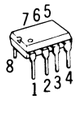
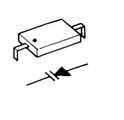
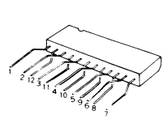
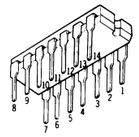
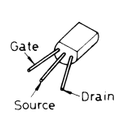
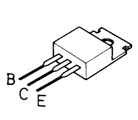
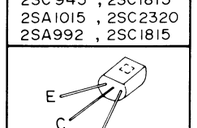
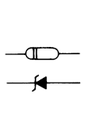
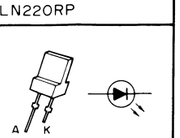
A Tuner circuit

D Equalizer circuit



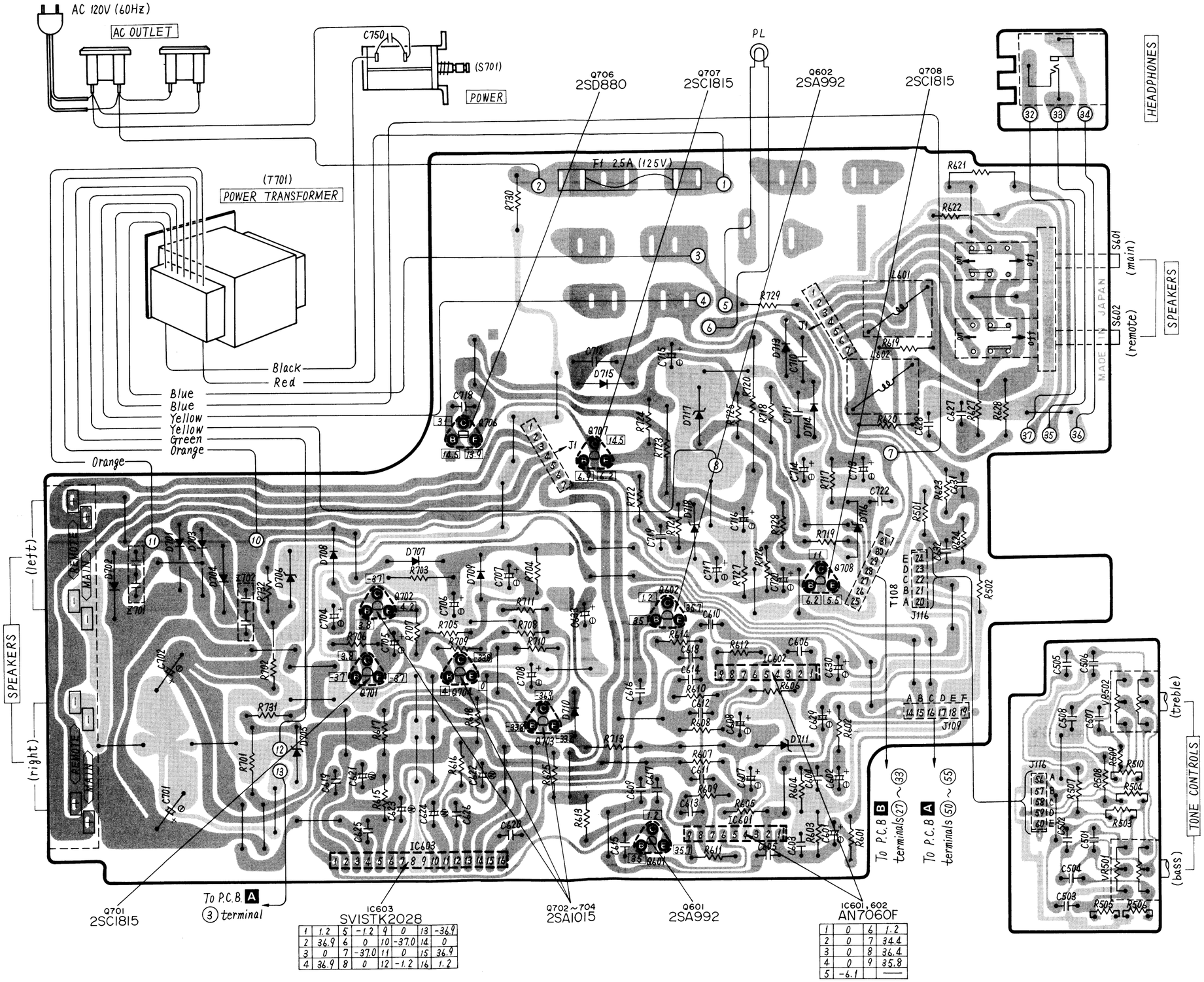


• Terminal guide of transistors, diodes and IC's

SVIμPC1018C, SVILA123INS SVIμPC1161C	SVINJM4559DS	AN7060F , AN6876	SVISTK2028	SVIDI703C016	SVIμPB553C	MA320G1-N
						
SVITA57	SVIμPD4011C	2SK195	2SD880	2SC1674 , 2SC1675 2SC945 , 2SC1815 2SA1015 , 2SC2320 2SA992 , 2SC1815	SVDMZ□□□□□	LN213RP , LN313GP LN220RP
						

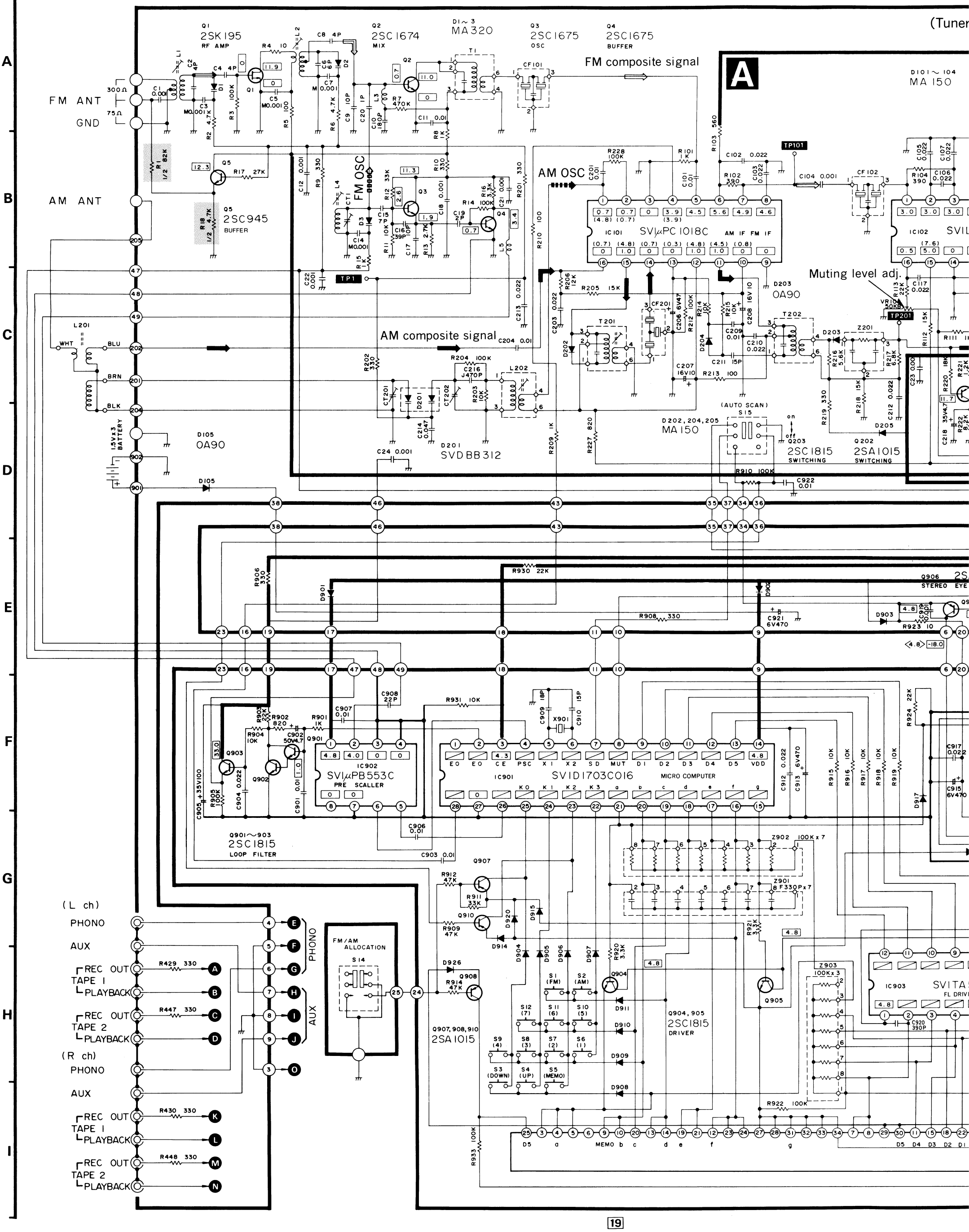
Main amplifier circuit

E



1	1.2	5	-1.2	9	0	13	-36.9
2	36.9	6	0	10	-37.0	14	0
3	0	7	-37.0	11	0	15	36.9
4	36.9	8	0	12	-1.2	16	1.2

1	0	6	1.2
2	0	7	34.4
3	0	8	36.4
4	0	9	35.8
5	-6.1		


(Tuner
A
FM composite signal
AM composite signal
Muting level adj.
FM ANT
GND
AM ANT
FM OSC
AM OSC
Q1 2SK195 RF AMP
Q2 2SC1674 MIX
D1~3 MA320
Q3 2SC1675 OSC
Q4 2SC1675 BUFFER
Q5 2SC945 BUFFER
D101~104 MA150
IC101 SVIμPC1018C AM IF FM IF
IC102 SVIL
TP101
TP1
TP201
D203 0A90
D105 0A90
D201 SVDBB312
D202,204,205 MA150
Q202 2SA1015 SWITCHING
Q203 2SC1815 SWITCHING
L201
T201
T202
Z201
CF101
CF102
CF201
1.5V×3 BATTERY
IC902 SVIμPB553C PRE SCALLER
IC901 SVID1703C016 MICRO COMPUTER
Q901~903 2SC1815 LOOP FILTER
Q907,908,910 2SA1015
Q904,905 2SC1815 DRIVER
Q906 2S STEREO EYE
D903
Z902 100K×7
Z901 8 F330P×7
Z903 100K×3
IC903 SVITA FL DRIV
(AUTO SCAN) S15
FM/AM ALLOCATION S14
(L ch)
PHONO
AUX
REC OUT TAPE 1 PLAYBACK
REC OUT TAPE 2 PLAYBACK
(R ch)
PHONO
AUX
R429 330
R447 330
R430 330
R448 330
R930 22K
R908 330
R923 10
R931 10K
R933 100K
R922 100K
R921 3.3K
R920 3.3K
R912 47K
R911 33K
R909 47K
R914 47K
R910 100K
C922 0.01
C921 6V470
C908 22P
C907 0.01
C906 0.01
C903 0.01
C24 0.001
C909 18P
C910 15P
X901
C912 0.022
C913 6V470
C915 6V470
C917 0.022
C920 390P
R924 22K
R915 10K
R916 10K
R917 10K
R918 10K
R919 10K
D901
D902
D904
D905
D906
D907
D908
D909
D910
D911
D914
D915
D917
D920
D926
S1 (FM)
S2 (AM)
S3 (DOWN)
S4 (UP)
S5 (MEMO)
S6 (1)
S7 (2)
S8 (3)
S9 (4)
S10 (5)
S11 (6)
S12 (7)
PHONO
PHONO
AUX
AUX
D5 a MEMO b c d e f g
D5 D4 D3 D2 D1
E
F
G
H
I
19

(Tuner circuit)

Q301, 302 2SA1015 AF AMP

Q303, 304 2SC945 MUTING

D101 ~ 104 MA 150

IC102 SVILA1231NS FM IF

IC301 SVIμPC1161C MPX

Q305 2SA1015 MUTING CONTROL

level adj.

MPX VCO adj.

Q202 2SA1015 SWITCHING

Q101, 102, 106 ~ 109 2SC1815 SWITCHING

Q103 ~ 105 2SA1015 SWITCHING

(MUTING) MODE

FREQUENCY METER

Frequency meter adj.

S401 (AUX)

S404

S405 (TAPE2)

source — tape 1

source — tape 2

VR402-2 250KB (VOLUME)

Q401 ~ 404 2SC2320 DIFFERENTIAL AMP

(Equalizer circuit)

Q906 2SA1015 STEREO EYE DRIVER

D919 SVDMZ306B

IC904 SVIμPD4011C NAND GATE

D927 LN220RP QUARTZ-LOCK INDICATOR

IC905 AN6876 SIGNAL LED DRIVER

SIGNAL-STRENGTH INDICATOR

D901 ~ 918, 920, 926 MA 150

D921 ~ 923 LN213RP

D924, 925 LN313GP

IC903 SVITA57 FL DRIVER

Q909 2SA1015 DRIVER

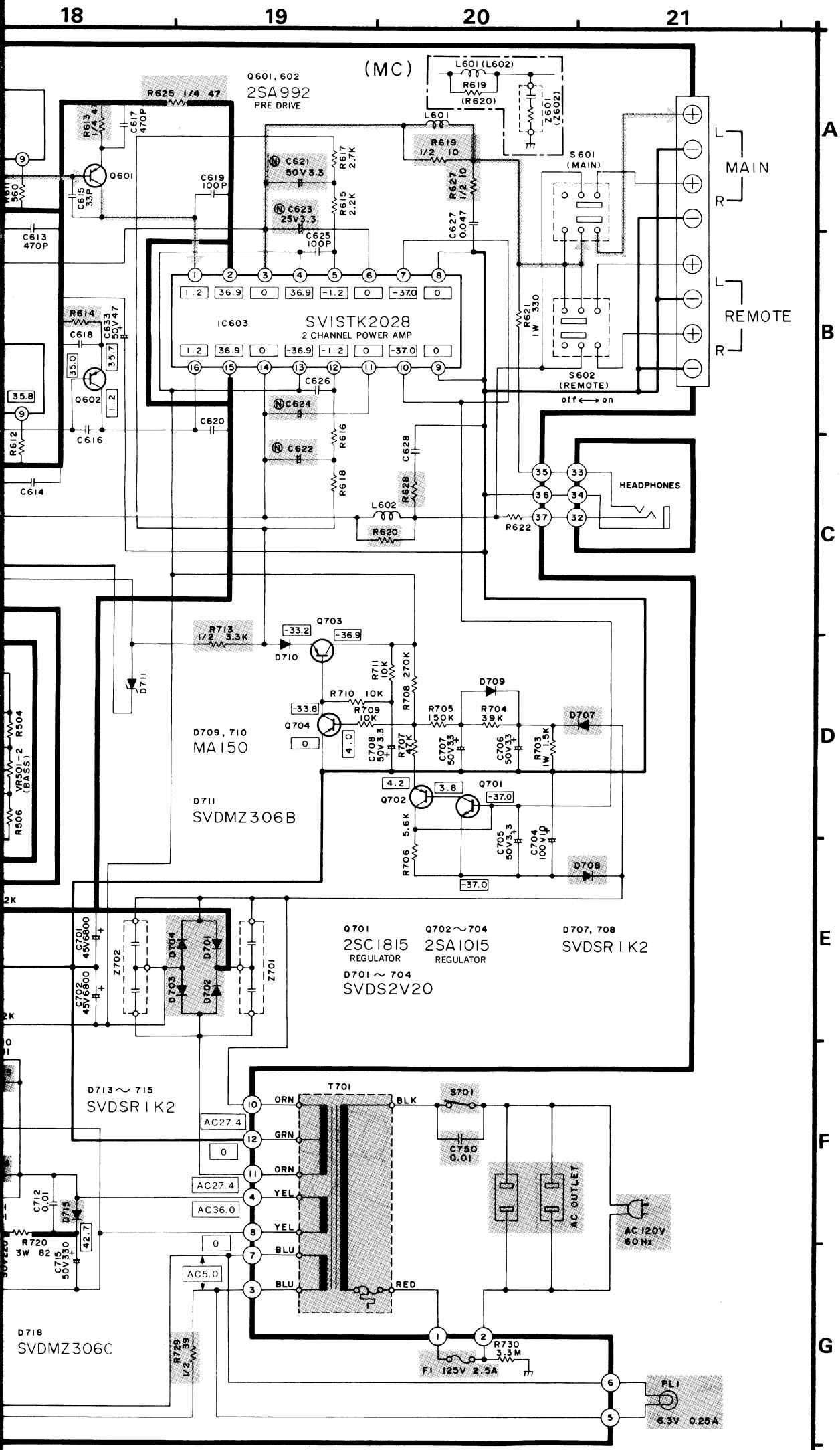
D5 D4 D3 D2 D1 Dp ST F P

(FM/AM preset tuning circuit)

(Main amplifier circuit)

(Equalizer circuit)

Audio frequency signal (L channel)



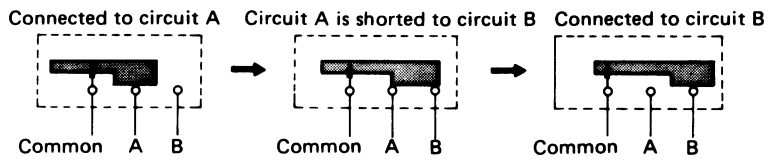
■ SCHEMATIC DIAGRAM

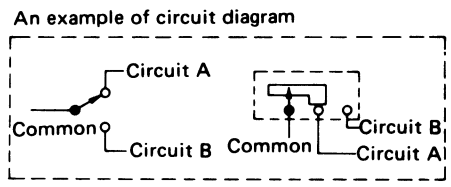
Note:

1. **S1, 2** : Band selectors switch.
   [S1 – FM / S2 – AM]
2. **S3, 4** : Tuning switch
   [S3 – down / S4 – up]
3. **S5** : Memory switch.
4. **S6 ~ 12** : Preset-tuning switch.
   [S6 – 1 ch, S7 – 2 ch, S8 – 3 ch, S9 – 4 ch, S10 – 5 ch, S11 – 6 ch, S12 – 7 ch]
5. **S14** : FM/AM allocation switch in "**FM 0.2MHz/AM 10kHz step**" position.
   FM 0.05MHz/AM 9kHz step ⟷ FM 0.2MHz/AM 10kHz step
6. **S15** : Automatic-scan switch in "**on**" position.
   on ⟷ off (manual)
7. **S16** : FM muting/FM mode switch in "**on/FM auto**" position.
   on/FM auto ⟷ off/FM mono
8. **S401 ~ 403** : Input selectors switch in "**tuner**" position.
   [S401 – aux. S402 – tuner, S403 – phono]
9. **S404, 405** : Tape-monitor selectors switch in "**source**" position.
   [S404 – tape 1, S405 – tape 2]
10. **S406** : Loudness switch in "**off**" position.
11. **S407** : Subsonic filter switch in "**off**" position.
12. **S601, 602** : Speaker selectors switch in "**main**" position.
    [S601 – main, S602 – remote]
13. **S701** : Power switch in "**on**" position.
14. Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
    * Figures in [ ] stand for DC voltage in FM/AM signal reception mode.
    * Figures in ⟨ ⟩ stand for DC voltage in FM stereo signal receptiom mode.
    * Figures in ⌜ ⌟ stand for DC voltage in FM (no signal) muting to on mode.
    * Figures in ( ) stand for DC voltage with the band selectors circuit set at AM.
15. Transistor and IC terminals which carry no voltage indication emit 5V pulse waveforms or are subject to change according to the frequency or input signal levels.
16. Signal lines
    - FM composite signal
    - Audio frequency signal
    - Positive voltage lines
    - AM signal

Shorting Switch (S401, 402, 403, 406 and 407)

This unit uses a shorting switch. As illustated below, the circuit is shorted to the next circuit without being opened.
In the circuit diagram, the shaded area represents the common terminal.





IMPORTANT SAFETY NOTICE

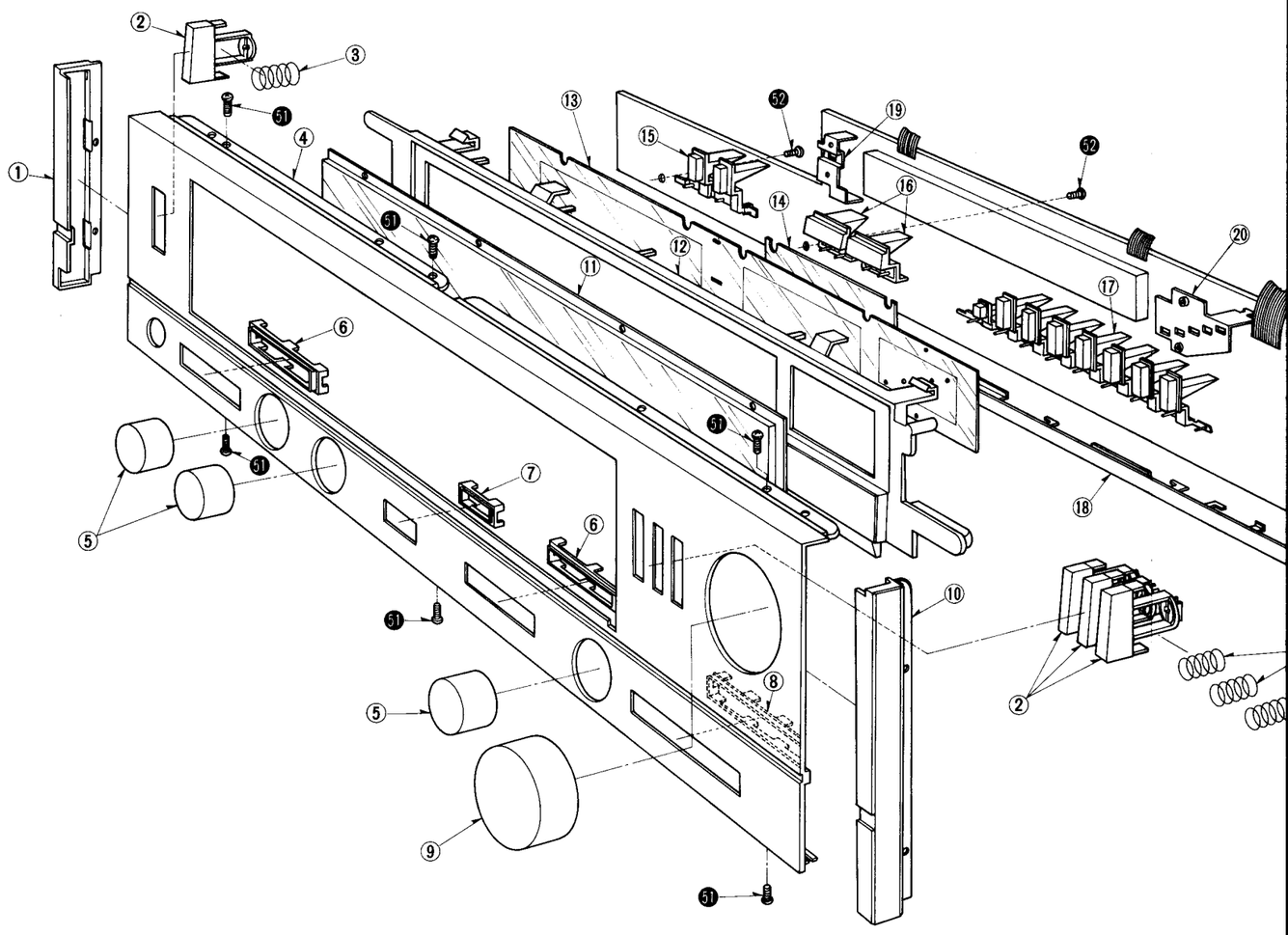
The shaded area on this schematic diagram incorporates special features important for safety.
When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

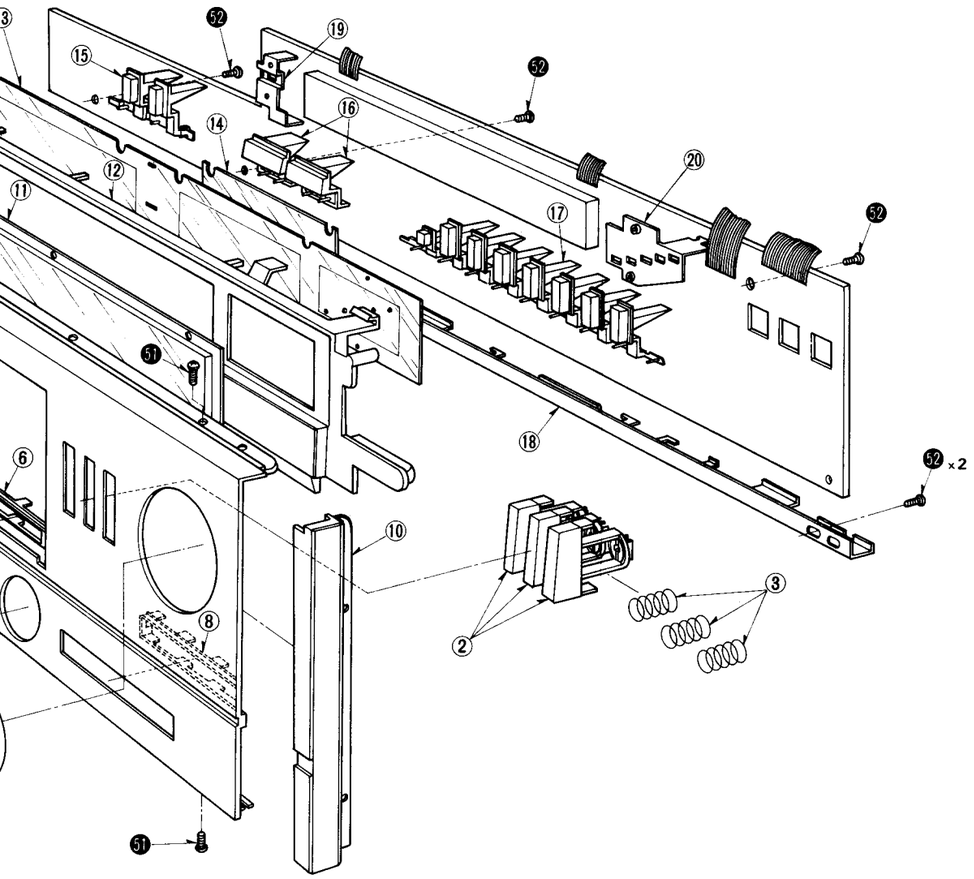
Continued from page 12

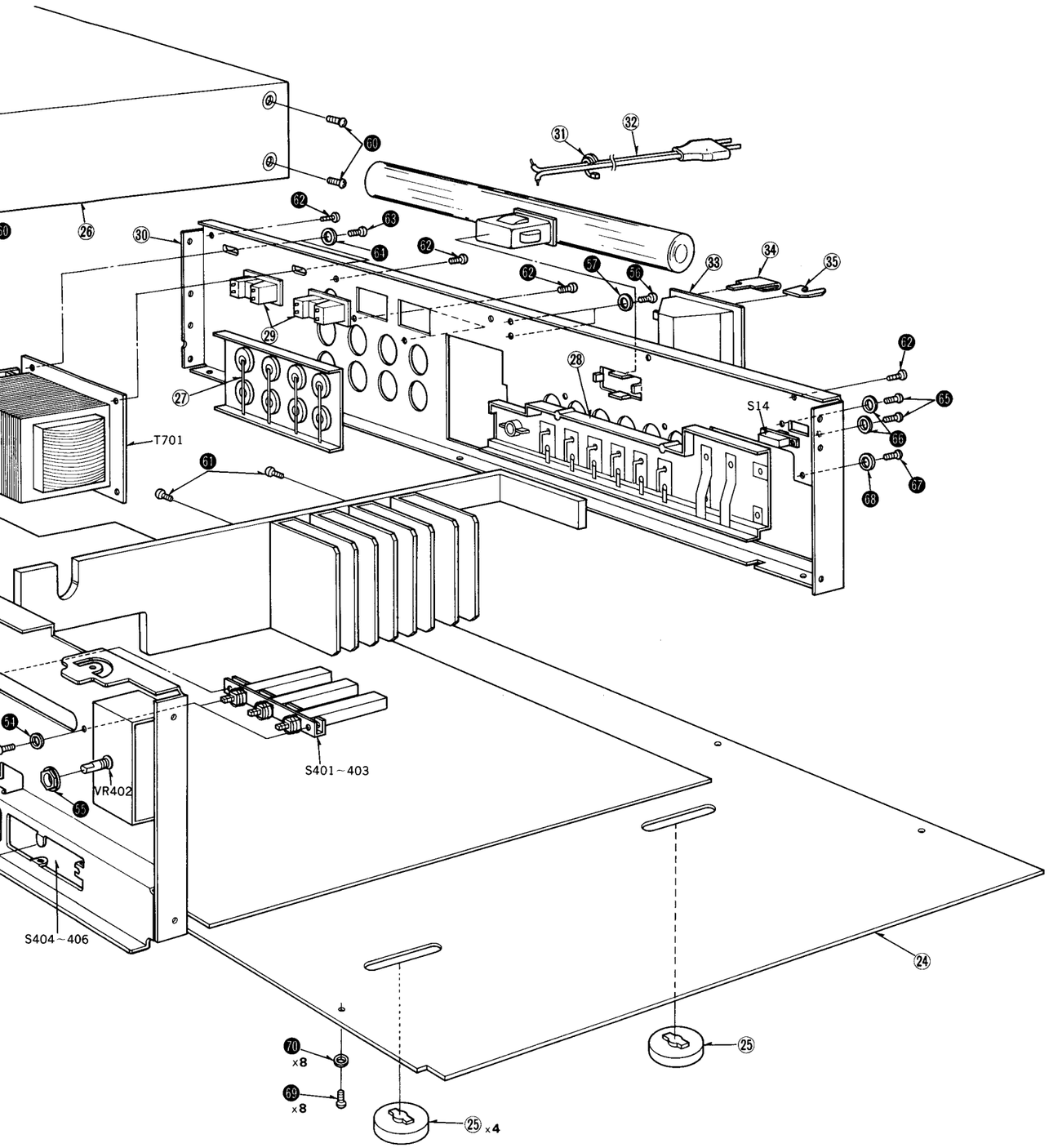
Ref. No.		Part No.	Part Name & Description
R908		**RRD18XK331**	Chip, 330Ω, 1/8W, ± 10%
R909		**RRD18XK473**	Chip, 47kΩ, 1/8W, ± 10%
R910		**RRD18XK104**	Chip, 100kΩ, 1/8W, ± 10%
R911		**RRD18XK333**	Chip, 33kΩ, 1/8W, ± 10%
R912		**RRD18XK473**	Chip, 47kΩ, 1/8W, ± 10%
R914		**RRD18XK473**	Chip, 47kΩ, 1/8W, ± 10%
R915, 916		**RRD18XK103**	Chip, 10kΩ, 1/8W, ± 10%
R917, 918		**RRD18XK103**	Chip, 10kΩ, 1/8W, ± 10%
R919		**RRD18XK103**	Chip, 10kΩ, 1/8W, ± 10%
R920, 921		**RRD18XK332**	Chip, 3.3kΩ, 1/8W, ± 10%
R922		**RRD18XK104**	Chip, 100kΩ, 1/8W, ± 10%
R923		**ERD25FJ100**	Carbon, 10Ω, 1/4W, ± 5%
R924, 925		**RRD18XK223**	Chip, 22kΩ, 1/8W, ± 10%
R926		**RRD18XK223**	Chip, 22kΩ, 1/8W, ± 10%
R927		**RRD18XK333**	Chip, 33kΩ, 1/8W, ± 10%
R928		**RRD18XK332**	Chip, 3.3kΩ, 1/8W, ± 10%
R929		**ERD25FJ221**	Carbon, 220Ω, 1/4W, ± 5%
R930		**RRD18XK223**	Chip, 22kΩ, 1/8W, ± 10%
R931		**RRD18XK103**	Chip, 10kΩ, 1/8W, ± 10%
R933		**ERD25TJ104**	Carbon, 100kΩ, 1/4W, ± 5%
CAPACITORS			
C1		ECKD1H102ZF	Ceramic, 0.001μF, 50V, +80% −20%
C2		ECCD1H040CC	Ceramic, 4pF, 50V, ±0.25pF
C3		ECKD1H102MD	Ceramic, 0.001μF, 50V, ± 20%
C4		ECCD1H040CC	Ceramic, 4pF, 50V, ±0.25pF
C5		ECKD1H102ZF	Ceramic, 0.001μF, 50V, +80% −20%
C6		ECCD1H060CC	Ceramic, 6pF, 50V, ±0.25pF
C7		ECKD1H102MD	Ceramic, 0.001μF, 50V, ± 20%
C8		ECCD1H040CC	Ceramic, 4pF, 50V, ±0.25pF
C9		ECCD1H100KC	Ceramic, 100pF, 50V, ± 10%
C10		ECCD1H181K	Ceramic, 180pF, 50V, ± 10%
C11		ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80% −20%
C12		ECKD1H102ZF	Ceramic, 0.001μF, 50V, +80% −20%
C14		ECKD1H102MD	Ceramic, 0.001μF, 50V, ± 20%
C15		ECUX1H070DC	Chip, 7pF, 50V, ± 0.5pF
C16		ECUX1H390KC	Chip, 39pF, 50V, ± 10%
C17		ECUX1H100KC	Chip 10pF, 50V, ± 10%
C18		ECUX1H102ZF	Chip, 0.001μF, 50V, +80% −20%
C19		ECUX1H020CC	Chip, 2pF, 50V, ±0.25pF
C20		ECUX1H010CC	Chip, 1pF, 50V, ±0.25pF
C21, 22		ECUX1H102ZF	Chip, 0.001μF, 50V, +80% −20%
C23, 24		ECKD1H102ZF	Ceramic, 0.001μF, 50V, +80% −20%
C101		ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80% −20%
C102		ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80% −20%
C103		ECUX1H223ZF	Chip, 0.022μF, 50V, +80% −20%
C104		ECKD1H102MD	Ceramic, 0.001μF, 50V, ± 20%
C105, 106		ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80% −20%
C107		ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80% −20%
C108		ECCD1H560K	Ceramic, 56pF, 50V, ± 10%
C109		**ECEA50Z1**	Electrolytic, 1μF, 50V
C110		ECCD1H050CC	Ceramic, 5pF, 50V, ±0.25pF
C111		**ECEA50M4R7R**	Electrolytic, 4.7μF, 50V
C112		ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80% −20%
C113		**ECEA1HS100**	Electrolytic, 10μF, 50V
C114		ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80% −20%
C116		ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80% −20%
C117		ECUX1H223ZF	Chip, 0.022μF, 50V, +80% −20%
C118		**ECEA50Z1**	Electrolytic, 1μF, 50V
C119		**ECEA0JS471**	Electrolytic, 470μF, 6.3V
C120		**ECEA50Z1**	Electrolytic, 1μF, 50V
C122		**ECEA50ZR68**	Electrolytic, 0.68μF, 50V
C129		ECCD1H560K	Ceramic, 56pF, 50V, ± 10%
C201		ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80% −20%
C203		ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80% −20%
C204		ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80% −20%
C206		**ECEA1AS470**	Electrolytic, 47μF, 10V
C207, 208		**ECEA1HS100**	Electrolytic, 10μF, 50V
C209		ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80% −20%
C210		ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80% −20%
C211		ECCD1H150KC	Ceramic, 15pF, 50V, ± 10%
C212, 213		ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80% −20%
C214		ECQM1H473KZ	Polyester, 0.047μF, 50V, ± 10%
C216		ECQP1471JZ	Polypropylene, 470pF, 100V, ± 5%
C217		ECQM1H473KZ	Polyester, 0.047μF, 50V, ± 10%
C218		**ECEA1JS4R7**	Electrolytic, 4.7μF, 63V
C301, 302		ECQM1H152JZ	Polyester, 0.0015μF, 50V, ± 5%
C303, 304		ECUX1H391KR	Chip, 390pF, 50V, ± 10%

Ref. No.		Part No.	Part Name & Description
C305, 306		ECQM1H562KZ	Polyester, 0.0056μF, 50V, ± 10%
C307, 308		**ECEA50ZR33**	Electrolytic, 0.33μF, 50V
C309		**ECEA50ZR47**	Electrolytic, 0.47μF, 50V
C310		ECQP1471JZ	Polypropylene, 470pF, 100V, ± 5%
C311		**ECEA50Z1**	Electrolytic, 1μF, 50V
C312		**ECEA50Z3R3**	Electrolytic, 3.3μF, 50V
C313		ECQM1H473KZ	Polyester, 0.047μF, 50V, ± 10%
C314		**ECEA50ZR47**	Electrolytic, 0.47μF, 50V
C315, 316		ECQM1H222KZ	Polyester, 0.0022μF, 50V, ± 10%
C317		**ECEA1HS100**	Electrolytic, 10μF, 50V
C319		ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80% −20%
C320		ECCD1H560K	Ceramic, 56pF, 50V, ± 10%
C401, 402		**ECEA50M3R3R**	Electrolytic, 3.3μF, 50V
C403, 403		ECCD1H101K	Ceramic, 100pF, 50V, ± 10%
C405, 406		ECCD1H680K	Ceramic, 68pF, 50V, ± 10%
C407, 408		**ECEA1CS330**	Electrolytic, 33μF, 16V
C409, 410		ECQM1H223JZ	Polyester, 0.022μF, 50V, ± 5%
C411, 412		ECQM1H682JZ	Polyester, 0.0068μF, 50V, ± 5%
C413, 414		**ECEA50Z1**	Electrolytic, 1μF, 50V
C415, 416		**ECEA1ES470**	Electrolytic, 47μF, 25V
C417, 418		ECKD1H331KB	Ceramic, 330pF, 50V, ± 10%
C419, 420		ECQM1H473KZ	Polyester, 0.047μF, 50V, ± 10%
C421, 422		ECQM1H823KZ	Polyester, 0.082μF, 50V, ± 10%
C423, 424		ECKD1H103MD	Ceramic, 0.01μF, 50V, ± 20%
C425, 426		**ECEA1ES101**	Electrolytic, 100μF, 25V
C501, 502		ECQM1H183KZ	Polyester, 0.018μF, 50V, ± 10%
C503, 504		ECQM1H104KS	Polyester, 0.1μF, 50V, ± 10%
C505, 506		ECQM1H272KZ	Polyester, 0.0027μF, 50V, ± 10%
C507, 508		ECQM1H223KZ	Polyester, 0.022μF, 50V, ± 10%
C601, 602		**ECEA50M3R3R**	Electrolytic, 3.3μF, 50V,
C603, 604		ECCD1H390K	Ceramic, 39pF, 50V, ± 10%
C605, 606		ECCD1H820K	Ceramic, 82pF, 50V, ± 10%
C607, 608		**ECEA1HS100**	Electrolytic, 10μF, 50V
C609, 610		ECCD1H020C	Ceramic, 2pF, 50V, ±0.25pF
C611, 612		ECCD1H330K	Ceramic, 33pF, 50V, ± 10%
C613, 614		ECKD1H471KB	Ceramic, 470pF, 50V, ± 10%
C615, 616		ECCD1H330K	Ceramic, 33pF, 50V, ± 10%
C617, 618		ECKD1H471KB	Ceramic, 470pF, 50V, ± 10%
C619, 620		ECCD1H101K	Ceramic, 100pF, 50V, ± 10%
C621, 622	⚠	ECEA1HN3R3S	Non-Polar Electrolytic, 3.3μF, 50V
C623, 624	⚠	ECEA1EN3R3S	Non-Polar Electrolytic, 3.3μF, 25V
C625, 626		ECCD1H101K	Ceramic, 100pF, 50V, ± 10%
C627, 628		ECQM1H473KZ	Polyester, 0.047μF, 50V, ± 10%
C629, 630		**ECEA1HS100**	Electrolytic, 10μF, 50V
C631, 632		ECCD1H150K	Ceramic, 15pF, 50V, ± 10%
C633		**ECEA1HS470**	Electrolytic, 47μF, 50V
C701, 702		**ECETS45V682U**	Electrolytic, 6800μF, 45V
C704		**ECEA2AS100**	Electrolytic, 10μF, 100V
C705		**ECEA50Z3R3**	Electrolytic, 3.3μF, 50V
C706, 707		**ECEA1JS330**	Electrolytic, 33μF, 63V
C708		**ECEA50Z3R3**	Electrolytic, 3.3μF, 50V
C710, 711		ECKD2H103PE	Ceramic, 0.01μF, 500V, +100% 0%
C712		ECKD2H103PE	Ceramic, 0.01μF, 500V, +100% 0%
C713		**ECEA1HS470**	Electrolytic, 47μF, 50V
C714		**ECEA1JS330**	Electrolytic, 33μF, 63V
C715		**ECEA1HS331**	Electrolytic, 330μF, 50V
C716		**ECEA1HS221**	Electrolytic, 220μF, 50V
C717		**ECEA1ES101**	Electrolytic, 100μF, 25V
C718, 719		ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80% −20%
C720		**ECEA1HS100**	Electrolytic, 10μF, 50V
C722		ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80% −20%
C750	⚠	ECKDMY103PF	Ceramic, 0.01μF, 125VAC, +100% 0%
C901		ECUX1H103ZF	Chip, 0.01μF, 50V, +80% −20%
C902		**ECEA50M4R7R**	Electrolytic, 4.7μF, 50V
C903		ECUX1H103ZF	Chip, 0.01μF, 50V, +80% −20%
C904		ECUX1H223ZF	Chip, 0.022μF, 50V, +80% −20%
C905		**ECEA1VS101**	Electrolytic, 100μF, 35V
C906, 907		ECUX1H103ZF	Chip, 0.01μF, 50V, +80% −20%
C908		ECUX1H220KC	Chip, 22pF, 50V, ± 10%
C909		ECUX1H180KC	Chip, 18pF, 50V, ± 10%
C910		ECUX1H150KC	Chip, 15pF, 50V, ± 10%
C912		ECUX1H223ZF	Chip, 0.022μF, 50V, +80% −20%
C913		**ECEA0JS471**	Electrolytic, 470μF, 6.3V
C915		**ECEA0JS471**	Electrolytic, 470μF, 6.3V
C916		**ECEA1ES470**	Electrolytic, 47μF, 25V
C917		ECUX1H223ZF	Chip, 0.022μF, 50V, +80% −20%
C918		ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80% −20%
C919		ECKD1H102ZF	Ceramic, 0.001μF, 50V, +80% −20%
C920		ECUX1H391KR	Chip, 390pF, 50V, ± 10%
C921		**ECEA0JS471**	Electrolytic, 470μF, 6.3V
C922		ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80% −20%

■ EXPLODED VIEWS




Meter
S701
Lamp
T701
S601, 602
VR501
VR502
VR401
VR402
S401~403
S404~406
×2
×8
×8
×4



■ REPLACEMENT PARTS LIST (Cabinet and Chassis Parts)

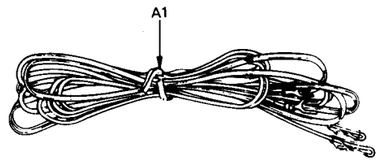
Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. ⚠ indicates that only parts specified by the manufacture be used for safety.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

* [M] is available in U.S.A.
* [MC] is available in Canada.

Ref. No.		Part No.	Part Name & Description
CABINET and CHASSIS PARTS			
1		SGX6967	Ornament, Left Side
2		SBC321	Button, Power Input Selector
3		SUS163	Spring, Power Input Selector
4		SGWA222M	Front Panel
5		SBN973	Knob, Tone, Balance Control
6		SGX6957	Sleeve, Button
7		SGX6959	Sleeve, Button
8		SGX7001	Sleeve, Button
9		SBN971	Knob, Volume Control
10		SGX6969	Ornament, Right Side
11		SGU195	Transparent Cover
12		SGX6971	Ornament Plate
13		SDU51	Plate, Ornament
14		SDU53	Tinted Plate
15		SBC329	Button, FM. AM
16		SBC327	Button, Tuning
17		SBC325	Button, FM/AM Preset
18		SUW1735	Bracket, P.C.B.
19		SHR9539	Holder, L.E.D. (Quartz Lock)
20		SHR9537	Holder, L.E.D. (Signal Strength)
21		SBC323	Button, Push Switch
22		SMP301	Cover, Lamp
23		SJJ61	Jack, Headphone
24		SYU265	Bottom Cover
25		SKL255	Foot
26		SKC630S1	Cabinet Cover
27		SJF4813–1	Terminal Board, Speaker
28		SJF8029–4N	Terminal Board
29	⚠	SJSA66–2	Socket, AC Outlet
30		SGP2510A	Rear Panel
31		RHR111	Bushing, AC Cord
32	⚠	RJA9YA	AC Cord
33		SJB3005	Battery Case
34		SJC7	Battery Terminal
35		SJC9	Battery Terminal
		SSM173–1	Meter

Ref. No.		Part No.	Part Name & Description
SCREWS, WASHERS and NUTS			
●		**XTB3+8BFZ**	Screw, Tapping, ⊕ 3 x 8
●		**XTB3+10B**	Screw, Tapping, ⊕ 3 x 10
●		**XSN3+6S**	Screw, ⊕ 3 x 6
●		**XWA3B**	Washer, Spring, ϕ3
●		SNE4021	Nut, (Volume)
●		**XTB3+8BFZ**	Screw, Tapping, ⊕ 3 x 8
●		**XWC3B**	Washer, External Toothed Lock, ϕ3
●		**XTN3+10**	Screw, Tapping, ⊕ 3 x 10
●		**XWG3**	Washer, Plain, ϕ3
●		**XTB4+8BFZ**	Screw, Tapping, ⊕ 4 x 8
●		**XTB3+16B**	Screw, Tapping, ⊕ 3 x 16
●		**XTB3+10BFZ**	Screw, Tapping, ⊕ 3 x 10
●		**XSN4+10BVS**	Screw, ⊕ 4 x 10
●		**XWA4BFZ**	Washer, Spring, ϕ4
●		**XSN26+6BV**	Screw, ⊕ 26 x 6
●		**XWA26**	Washer, Spring, ϕ26
●		**XTB3+8BFZ**	Screw, Tapping, ⊕ 3 x 8
●		**XWC3B**	Washer, External Toothed Lock, ϕ3
●		**XTN3+12B**	Screw, Tapping, ⊕ 3 x 12
●		**XWG3**	Washer, Plain, ϕ3
ACCESSORY			
A1		SSA267	Cord, FM Indoor Antenna
PACKING PARTS			
P1		SPP649	Polyethylene Bag
P2		SPS2997	Pad, Left Side
P3		SPS2999	Pad, Right Side
P4 [M]		SPG2829	Carton Box
P4 [MC]		SPG2831	Carton Box
P5 [M]		SQF10655–2	Instrucitons Book, Printed Matter
P5 [MC]		SQF10657–1	Instructions Book, Printed Matter

• Accessory



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ORDER NO. SD81061961C4

Service Manual

FM/AM Stereo Receiver

SA-222

[PA], [PE]

Areas

* [PA] is available in for East PX.
* [PE] is available in European Military.

Please use this manual together with the service manual for Model No. SA-222 [M, MC] Order No. SD8012-1811.

CHANGES

■ REPLACEMENT PARTS LIST

Ref. No.	Change of Part No. SA-222 [M, MC] (ORDER NO. SD8012-1811) → SA-222 [PA, PE]		Part Name & Description	Per Set (Pcs.)	Remarks
COILS and TRANSFORMERS					
T701	SLT5M137	SLT5P217–W	Transformer, Power Source	1	
VARIABLE RESISTORS					
R136	RRD18XK393	**EVNK0AA00B54**	Frequency Meter Adjustment, 50kΩ (B)	1	
COMPONENT COMBINATIONS					
Z601, 602	Addition	ECQJ0517	Component Combination, 0.047μF, 10Ω	2	
FUSES					
F1	XBA1F25NU14	XBA2C20TR0	Fuse, T 2A (250V)	1	
F2	Addition	XBA2C10TR0	Fuse, T 1A (250V)	1	
F3, 4	Addition	XBA2C06TR0	Fuse, T 630mA (250V)	2	
SWITCHES					
S701	ESB90144T	ESB90159S	Switch, Power	1	
S702	Addition	ESE37200	Switch, Voltage Selector	1	
RESISTORS					
R105	ERO25CKF3302	ERO25CKF2702	Metal Film, 27kΩ, 1/4W, ± 1%	1	
R136	RRD18XK393	Deletion	.....	0	
R199	ERD25TJ224	Deletion	.....	0	
R303	RRD18XK153	**RRD18XK223**	Chip, 22kΩ, 1/8W, ± 10%	1	
R304	ERD25TJ153	**ERD25TJ223**	Carbon, 22kΩ, 1/4W, ± 5%	1	
R455, 456 457, 458	Addition	**RRD18XK472**	Chip, 4.7kΩ, 1/8W, ± 10%	4	
R459, 460	Addition	**ERD25TJ394**	Carbon, 390kΩ, 1/4W, ± 5%	2	
R461, 462	Addition	**ERD25TJ104**	Carbon, 100kΩ, 1/4W, ± 5%	2	
R609, 610	Addition	**ERD25FJ102**	Carbon, 1kΩ, 1/4W, ± 5%	2	
CAPACITORS					
C301, 302	ECQM1H152JZ	ECQM1H122JZ	Polyester, 0.0012μF, 50V, ± 5%	2	
C305, 306	ECQM1H562KZ	ECQM1H472KZ	Polyester, 0.0047μF, 50V, ± 10%	2	
C320	ECCD1H560K	ECCD1H121K	Ceramic, 120pF, 50V, ± 10%	1	
C750	ECKDMY103PF	ECKDKC103PF	Ceramic, 0.01μF, 400VAC, $^{+100}_{-0}$%	1	

Technics

Panasonic Tokyo
Matsushita Electric Industrial Co., Ltd.
1-2, 1-chome, Shiba-koen, Minato-ku, Tokyo 105 Japan

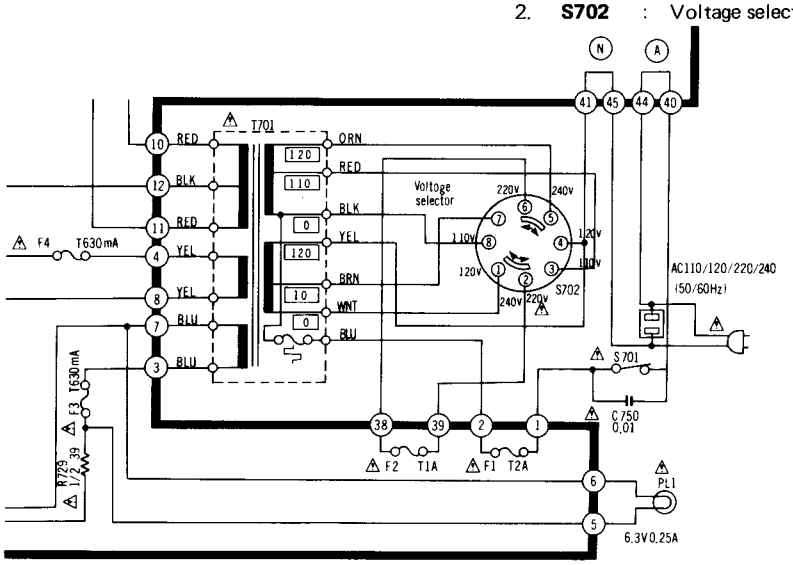
Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Ref. No.	Change of Part No.		Part Name & Description	Per Set (Pcs.)	Remarks
	SA-222 [M, MC] (ORDER NO. SD8012-1811) →	SA-222 [PA, PE]			
CABINET and CHASSIS PARTS					
28	SJF8029–4N	SJF8029N	Terminal Board	1	
30	SGP2510A	SGP2510–2C	Rear Panel	1	
31	RHR111	SHR127	Bushing, AC Cord	1	
32	RJA9YA	**RJA52Z**	AC Cord	1	
33	SJB3005	SJB3005–1	Battery Case	1	
ACCESSORY					
A2	Addition	RJP120ZBS	Plug Adapter, Power Source	1	
PACKING PARTS					
P4	SPG2829 SPG2831	SPG2899	Carton Box	1	○
P5	SQF10655–2 SQF10657–1	SQF10961	Instructions Book, Printed Matter	1	○

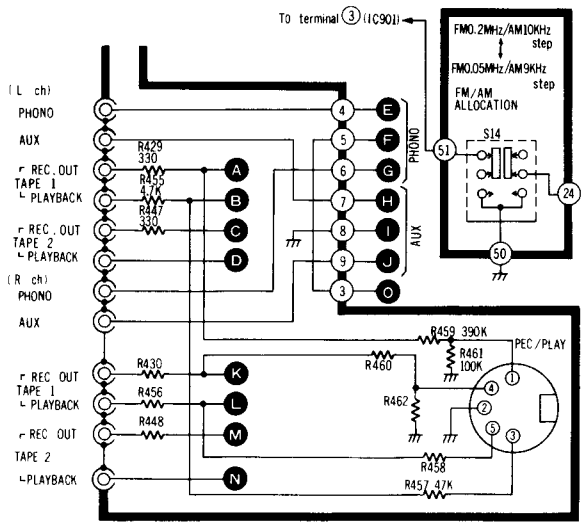
■ CHANGE OF SCHEMATIC DIAGRAM

- **Power source circuit**

Notes: 1. **S701** : Power source switch in "**on**" position.
2. **S702** : Voltage selector switch in "**240V**" position.



- **REC/PLAY circuit**



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